

Food Safety Standards

How Risk Management Programmes are
Negotiated, Constructed, and Contested
in the
New Zealand Meat Industry

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Abstract

In 1999 the *Animal Products Act* was passed into law. This Act fundamentally alters the way that meat safety standards are implemented in the New Zealand meat industry by legislating the introduction of risk management programmes (RMP) to manage hazards in meat products. The Ministry of Agriculture and Forestry (MAF) holds that RMP strengthens meat safety standards by ensuring that they are based on objective science rather than the subjective judgements of government meat inspectors. MAF explains that this will also allow the government to establish a unified New Zealand meat safety standard to which all parties may be held accountable.

This thesis explores MAF's assertion that RMP and the New Zealand standard are the products of an objective, scientific method. My central argument is that the construction, implementation, and monitoring of RMP and the New Zealand meat safety standard are not the product of some privileged scientific process. Instead, I argue that they are negotiated, constructed, and contested by networks made up of both human and nonhuman actors in the meat sector and that their outcomes are a product of this process. My study is based on a textual analysis of government and meat industry documents together with twenty-five semi-structured interviews with representatives from the government, the meat industry and other stakeholders within the network surrounding the meat sector.

This thesis focuses on the arguments and methods that MAF used to win various actors to a new network based on RMP and the New Zealand standard. What linked this network together was not a unified understanding of the scientific benefits of risk management but rather a concern for how to ensure that the meat industry would remain internationally competitive and profitable. Instituting a new arrangement for meat safety based on RMP emerged as the means to achieve this. The assumption being that RMP would reduce costs and increase flexibility in the meat industry and thereby ensure market access internationally. As the thesis illustrates, however, this goal has been difficult to achieve as attempts by MAF to construct and negotiate the implementation of new meat safety standards has been contested by other actors within the network at every stage.

Table of Contents

Acknowledgements	i
Abstract	ii
Table of Contents	iii
Chapter One—Setting the Scene	1
1.1 Introduction	1
1.2 Setting the scene	2
1.3 The hygiene revolution	3
1.4 The international marketplace – ‘free trade’ vs protectionism	5
1.5 The rise of the foodborne pathogen	6
1.6 The solution – risk analysis	6
1.7 MAF’s position on risk in relation to food safety	7
1.8 Implementing, monitoring, and policing rmp	11
1.9 Chapter outline	13
Chapter Two—Risk as the Product of Actor-Networks	15
2.1 Introduction	15
2.2 MAF’s position on risk in relation to food safety	16
2.3 Risk as a ‘socially constructed’ phenomenon	18
2.4 Science and risk as the product of actor-networks	19
2.5 The sociology of translation	23
2.6 Conclusion	25
Chapter Three—Examining the Research Process	27
3.1 Introduction	27
3.2 Document analysis	29
3.3 The interviews	31
3.4 Data analysis	36
Chapter Four—Constructing the Network	38
4.1 Introduction	38
4.2 Winning international support for risk management	39
4.3 Enrolling the New Zealand meat industry	42

4.4 Opportunities for a New Zealand meat safety standard	44
4.5 Reducing costs to business	47
4.6 The meat sector's response	48
4.7 Making risk management mandatory	50
4.8 Conclusion	51
Chapter Five—Contesting the Network	53
5.1 Introduction	53
5.2 Key actors in the export network: The role of the EU and the US	54
5.3 The role of foodborne pathogens as actors	56
5.4 What is science?	59
5.5 Status quo in the export meat sector	60
5.6 Interpreting RMP	61
5.7 Comparing the domestic and export meat industry networks	63
5.8 Disparity in the domestic sector	65
5.9 Negotiating responsibility for standards	68
5.10 Conclusion	69
Chapter Six—Conclusion	73
6.1 Introduction	73
6.2 Risk as the product of actor-networks	74
6.3 Translating interests	76
6.4 The role of nonhumans actors	78
6.5 Contesting the network	79
6.6 Further research	81
6.7 Conclusion	83
References	84
Appendix A: List of interviewees (by affiliation)	88
Appendix B: List of interviewees (by name)	90
Appendix C: Glossary of terms	93
Appendix D: University of Canterbury Human Ethics Committee Letter	97

Chapter One

Setting the Scene

New Zealand food is produced in a clean environment by people committed to safe, sustainable farming and processing methods while maintaining the highest standards. The popular image of New Zealand's clean environment is indeed a deserved one; and nowhere is this better expressed than in the quality and safety of the food that's grown there.

Andrew McKenzie, Director, MAF Food Assurance Authority, 2000

1.1 Introduction

In 1999 the *Animal Products Act* (APA or 'the Act') was passed into law. This Act is set to fundamentally alter the way that meat safety standards in New Zealand are established, implemented, and monitored throughout the meat industry. Previously, food safety hazards were the responsibility of government-trained and -certified meat inspectors, who checked all meat products for defects through their sight, smell, touch and taste (Juska *et al* 2000). With the passage of the APA, this 'hands-on' approach for ensuring meat safety is to be replaced by a system that focuses on the documentation and auditing of procedures to manage hazards, known as risk management.

The Ministry of Agriculture and Forestry (MAF)¹ argues that risk management programmes (RMP) based on HACCP (Hazard Analysis Critical Control Point)² systems will ensure that new standards are the product of objective, scientific study (Inkster and Walker 2001). On this basis, MAF hopes to establish a single New Zealand meat safety standard encompassing both the export and domestic meat sectors that will supersede the varied and costly requirements currently set by overseas trade partners and customers. MAF believes that such

¹ While I use the term MAF throughout this thesis I acknowledge that MAF is not a homogenous organisation with a uniform position on RMP. However, most of the information that I reference as MAF is based on their public position that can be found in documents authored by them.

² MAF (2000b) describes HACCP as a scientific food production and inspection system that was first developed in the United States by NASA to ensure food safety for astronauts. Following the principles of risk analysis, HACCP focuses on preventative measures rather than end product testing and is applied throughout the food chain, from producer to consumer. Food is 'monitored throughout the production process so that all potential hazards (e.g., micro-organisms, chemical hazards and physical hazards) are either prevented or reduced to negligible levels'.

requirements have more to do with defending commercial and political interests than ensuring food safety, and it argues that a New Zealand standard based on scientifically verifiable risk management practices avoids such conflicts.

My thesis challenges this view. My argument throughout the following chapters is that the construction, implementation and monitoring of RMP and the New Zealand standard are not the product of some privileged scientific process. Instead, I argue that they are negotiated, constructed and contested by networks made up of both human and nonhuman actors in the meat sector and that their outcomes are a product of this process. What linked this network together was not a unified understanding of food safety practices but rather a common concern for how to ensure the international competitiveness and profitability of the New Zealand meat industry. Instituting a new arrangement for meat safety based on RMP emerged as the means to achieve this because it was assumed that RMP would reduce costs and improve global market access.

In this introduction I will provide a background for why RMP was introduced, outline MAF's thinking about meat safety and briefly summarise the content of the chapters in this thesis.

1.2 Setting the scene

This section provides a brief background of some of the major political and economic changes that have taken place in the meat industry since the early 1970s, when meat safety issues first came to the fore. These changes provide a framework for understanding what motivated certain officials within MAF to consider alternative methods for evaluating meat safety.

Of central importance here is New Zealand's position as an export-dependent meat producer. While a great deal of debate is currently taking place about developing New Zealand into a 'knowledge economy', the reality remains that economic value in this country is largely derived from the agricultural sector, and there is little evidence to indicate that this scenario is about to change. Unlike most countries, which consume domestically most of the meat they produce, New Zealand's meat industry is almost totally export dependent. Approximately 90 percent of New Zealand lamb and 80 percent of New Zealand beef is sold overseas, making the country the world's first and fourth largest exporters respectively (Taylor 2000). Altogether, New Zealand exports of beef and sheep meat, edible offal and other animal by-

products were worth NZ\$4 billion in 2000, one-sixth of New Zealand's total exports (Taylor 2000). But this trade amounted to barely 1.7 percent of the world's total consumption (Taylor 2000). In short, New Zealand's meat industry is utterly reliant on overseas trade partners, and developments in the international trading arena therefore have the potential to impact significantly on its future prospects, as they do for the New Zealand economy as a whole.

This is demonstrated clearly in the case of New Zealand's two most valuable trading partners the United States (US) and the European Union (EU). New Zealand's dependence on these markets has meant that overseas customers have been able to dictate to New Zealand the meat safety standards required. The New Zealand meat industry has argued that many of these standards exceed those required for domestic industries in either the US or EU, and that they amount to unfair trade barriers. Such arguments have not been persuasive, however.

1.3 The hygiene revolution

The year 1972 marked a major turning point for the New Zealand meat industry, as both the US and the EU ³ enacted new legislation demanding significantly greater hygiene standards from all partners wishing to export their product to either market. The new rules stipulated that individual meat plants would have to be 'listed' as complying with the veterinary and meat hygiene requirements of their home government (Calder and Tyson 1999:39). The US and the EU demanded both a macroscopic (organoleptic) and microscopic inspection of animals and carcasses by qualified government meat inspectors. These practices were designed to ensure that all imported meat was clean, healthy, and free from disease and residues (Calder and Tyson 1999:40). The new meat safety standards required more than simply new methods of inspection and testing, however. To meet the new demands required the total renovation of meat plants and a revolution in work practices.⁴ These changes took more than ten years and close to two billion dollars to institute (Calder and Tyson 1999:42).

³ The EU at this time was referred to as the European Community.

⁴ The changes included, for example, completely separating edible and inedible processes, including the workers and their amenities; mechanical ventilation for areas such as the slaughterboard and cooling floors; bacterial testing to be introduced in works laboratories, along with new testing for insecticides, pesticides, and other residues; all construction to be replaced with impervious materials. As well, more labour was required to carry out the hygiene procedures, such as sterilising your knife between tasks to avoid cross-contamination. This led to increased costs as numbers on each mutton chain, for example, climbed from around 37 butchers and labourers to between 58-60 (Calder and Tyson 1999: 41-42).

The New Zealand meat standards subsequently adopted were the product of an alliance between MAF and equivalent agencies in the US and EU. Meat inspectors and veterinarians were employed by the New Zealand government to ensure that all hygiene regulations were complied with (NZ Freezing Companies Association *et al* 1980). These government officers inspected all meat for signs of disease or contamination, and they had the authority to reject any product they considered unfit for human consumption. They inspected livestock individually, warranting them before slaughter, and they checked all processing areas and structures for conformity to hygiene standards (Hamilton 2000). These requirements led to a trebling of inspection personnel, so that by 1985 there were 1520 meat inspectors and 148 vets (Calder and Tyson 1999: 41). Based on these procedures, consumers were expected to be confident that New Zealand meat was, as one British veterinarian put it, 'clean and well inspected and up to standard' (Calder and Tyson 1999: 43).

These new standards were soon contested by the New Zealand meat industry, however, which asserted that the regulations were politically and economically motivated (Butler 2000). Their argument was based on the view that New Zealand producers were being asked to meet standards more rigorous than those required of US and EU producers and that none of the hygiene regulations were scientifically proven to be essential to food safety. In fact, there were a great variety of 'standards' that the meat industry in New Zealand had to meet (Hill 2000), and as they seemed to have little basis in science, they were seen as thinly disguised measures to protect the meat products of their trading partners from cheaper New Zealand imports (Butler 2000).

Meat companies here argued that the costs involved in meeting these higher standards put New Zealand meat at a competitive disadvantage internationally and MAF agreed. Andrew McKenzie, director of the MAF Food Group Authority, said that the EU and the US 'called the shots' and that their demands were 'conflicting and incompatible' (Morel 1996:15). McKenzie argued that many of their requirements simply added costs to the industry without necessarily improving food safety (Morel 1996:15). However, constrained by their dependence on access to the US and EC markets, companies here could do little to challenge the position they were in.

1.4 The international marketplace – ‘free trade’ vs protectionism

Concern by the New Zealand meat industry that hygiene regulations were politically and economically motivated was soon joined by fears that access to overseas markets could be closed off altogether unless clear international trade agreements could be reached (MIRINZ et al 1996). A key issue for them was the proliferation of measures described as ‘green protectionism’, whereby countries seek to deny entry of certain products on the grounds that these imports could threaten the health of their human or animal populations or the environment⁵ (Campbell and Coombes 1999). Green protectionism arose in response to declarations by the World Trade Organization (WTO) after 1995 that new tariffs were ‘illegal’. Opponents of green protectionism, such as New Zealand, argued that these informal trade barriers became a means for countries to effectively circumvent WTO rules and regulations in order to protect their domestic agricultural produce from cheaper imports.

The drive by the New Zealand government to win acceptance at the WTO and other international forums for internationally agreed rules for trade liberalisation was proving to be a double-edged sword for the meat industry here. While trade liberalisation improved the potential for New Zealand to access new markets, it also facilitated the entry of new foreign competitors who could now compete directly with this country’s products in many international markets. One new competitor was Argentina. Beef from Argentina had been excluded from markets in North East Asia and North America due to the existence of foot-and-mouth disease. This exclusion provided significant competitive advantages to New Zealand⁶ (Rae et al 1998:2). However, once Argentina succeeded in eradicating the disease in 1996 the trade ban was lifted. MAF (2000a) says that country’s like Argentina ‘are able to produce the same products that we can more cheaply and they are closing the gap very fast in terms of quality (of both products and customer service) and their capacity to innovate’. As a consequence MAF now recognises that a strategy of supporting ‘free trade’ measures is not

⁵ The US, for example, challenged a European Union ban on the sale of beef from cattle that have been raised with certain artificial growth hormones and in 1998 a WTO appellate panel ruled against the EU law, giving the EU until May 13, 1999 to open its markets to hormone-treated beef (Working Group on the WTO/MAI 1999:7). Similarly, when many of Britain’s trade partners in Europe sought to ban British beef from Europe in the wake of the BSE outbreak, Britain argued that the ban had no scientific validity and was therefore unjust and unlawful (Macnaghten and Urry 1998:261).

⁶ The outbreak in 2001 of foot-and-mouth in Britain and the consequential ban on British meat exports highlights the importance of sanitary measures in world trade.

enough to guarantee economic success, since ‘we cannot rely on our comparative advantage as producers’ of sheep or cattle ‘to provide profitable returns’ (MAF 2000a).

1.5 The rise of the foodborne pathogen

Trade issues emerged in a new light from the late 1980s, when the US, Japan, Britain and several West European countries were confronted with growing incidences of meat-related food poisoning. These sometimes-fatal outbreaks resulted from the emergence of new deadly pathogens, including salmonella and *e-coli*⁷, and diseases such as bovine spongiform encephalopathy (BSE). While New Zealand has been fortunate not to confront these diseases, it is recognised that there is the potential for them to occur, which would have economically devastating consequences for an export-dependent nation (Orchard *et al* 2000). As Minister of Parliament Bill Sutton⁸ (1998:14633) has said in regards to the outbreak of BSE in Britain, ‘We cannot afford to have an incident of that nature in New Zealand, because it would affect the reputation of our food products worldwide. We cannot afford to have that happen. We have to be right out there and be world leaders in terms of assuring the safety of food products from New Zealand’.⁹

1.6 The solution – risk analysis

Despite growing international trade liberalisation and access to new markets, the past twenty years has proved costly to the New Zealand meat industry. With export meat products representing a significant share of the country’s economy, MAF and the government were concerned that New Zealand meat should remain competitive in the international trading arena. But the use of hygiene issues by New Zealand’s trading partners as a protectionist measure, together with increasing competition from other meat producing countries, and global incidences of deadly food safety outbreaks, highlighted the fact that a ‘business as

⁷ E. Coli 0157:H7 is a new, more dangerous variant of the pathogen, which I refer to simply as *e-coli*.

⁸ At the time of this comment Sutton was a Minister in opposition. Since the elections in 1999 he has been the Minister of Agriculture and Forestry.

⁹ According to Macnaghten and Urry (1998) the economic consequences of the BSE crisis in Britain included ‘the effective collapse of a £500 million beef export industry, a longer-term ban on British beef across the European Union...the slaughter of over a million cattle’ and ‘rising costs of measures to deal with BSE, estimated in late 1996 at over £2.5 billion’.

usual' approach would not suffice. MAF believed that if the meat industry was to remain viable then two questions had to be addressed: first, how to increase efficiency and cost-effectiveness in its application of hygiene standards; and second, how to ensure continued access to international markets (MAF 2000a). In other words, an approach was necessary that would not only improve market access but also improve the terms of such access for New Zealand.

In their history of the meat industry, authors Mick Calder and Janet Tyson (1999)¹⁰, explain that what was proposed by MAF as the key to successful change was the acceptance in New Zealand and internationally of 'scientifically justified and cost-effective' meat hygiene programmes based on risk analysis principles (Calder and Tyson 1999: 362). In 1987, Andrew McKenzie was appointed as the new head of the Meat Division of MAF, and from then on MAF began to present a series of new proposals for the meat industry focused on the concept of risk management (Calder and Tyson 1999:362). McKenzie is pointed to by Calder and Tyson (1999), and was singled out during interviews with representatives of the meat industry, as the architect of RMP (Alliance 2000; PPCS 2000). How McKenzie and MAF set about to win the meat industry to the concept of RMP is the subject of Chapter Four *Constructing the Network*.

1.7 MAF's position on risk in relation to food safety

A central objective of this thesis is to explore the assertion by MAF that risk assessment and risk management are the products of an objective, scientific method. My argument is that the way risk in the New Zealand meat industry is constructed, implemented and monitored is best understood as the outcome of network interactions among both human and nonhuman actors. Before elaborating my argument in the remainder of these chapters, it is appropriate that I first allow readers to understand how MAF views risk, since it is their views that shape the discussion that is taking place throughout the meat sector. The summary below broadly represents MAF's position on how the science of risk assessment and risk management in relation to food safety is established. These views have been published in New Zealand trade journals, such as the *Dairy Exporter* and *Food Technology*; academic journals, such as *Journal of Food Protection* and *Meat & Human Health Symposium*; as well as government

¹⁰ Calder and Tyson are both previous members of the New Zealand Meat Producers Board.

publications, such as *Food Focus*, and most extensively in a document titled *Food Administration in New Zealand: A Risk Management Framework for Food Safety* published by the MoH and MAF Food Harmonisation Project 2000.

Dr Bill Jolly from MAF defines risk in relation to food safety as ‘a function of the probability of an adverse affect, and the severity of that effect, consequential to a hazard(s) in food’ (Jolly 1997). In discussions about the application of a risk analysis paradigm to deal with hazards to human health in food, the process is separated into two separate but overlapping methodological stages: risk assessment and risk management. MAF argues that recognising the difference between a “hazard” and a “risk” is a fundamental issue in this process. A hazard is a biological, chemical, or physical agent in food that has the potential to cause an adverse health effect in consumers. In contrast, risk is a function of the probability of adverse health effects and the severity of those effects in the population consuming the food. Risks, they explain, can therefore only be expressed in terms of the consumer (Hathaway 1997; MoH and MAF Food Harmonisation Project 2000).

Risk Assessment

MAF explains that food safety risk assessments involves a primarily scientific process of evaluation that takes place to assess the probability of occurrence and the severity ‘of known or potential adverse health effects that result from human exposure to hazards in foods’ (Hathaway 1997:1433; MoH and MAF Food Harmonisation Project June 2000:11). Any such assessment is expected to incorporate four analytical steps. Steve Hathaway (1997:1435) and Jolly (1997) outline these four steps as:

- Hazard identification: the identification of known or potential adverse health effects associated with a particular agent;
- Hazard characterisation: which is the qualitative and quantitative evaluation of the nature of the adverse effects, which may include a dose/response assessment;
- Exposure assessment: which is the qualitative and/or quantitative evaluation of the degree of dietary intake likely to occur; and
- Risk characterisation: which is the integration of the above steps into an estimation of the adverse effects likely to occur in a given population, including attendant uncertainties.

MAF explains that while the goal is a quantitative estimate of risk, qualitative expressions of risk are common in many situations. Cost, availability of technical resources and timeliness will be key factors in deciding whether to pursue a formal risk assessment (MoH and MAF Food Harmonisation Project June 2000:11). Hathaway says that while inclusion of quantitative information to the greatest extent possible is a goal, use of qualitative information and ranking of risk in qualitative categories may be a useful outcome of the risk assessment process (Hathaway 1997:1435). A qualitative risk estimate would be based on non-numerical categorisation, for example, ranking of levels of risk as high, medium or low (MoH and MAF Food Harmonisation Project June 2000:11).

The problems associated with risk assessment of food-borne microbiological hazards, according to Van Der Logt and Hathaway (1997:95), are very different to risk analysis of food-borne chemicals or other hazards. Microbial pathogens multiply and die and the biological interactions are complex. The contamination levels of the raw material entering the food chain dictate the character of the initial microflora but these contamination levels can be markedly effected by subsequent events. Additionally, human pathogenicity of animal and environmental strains, and the interaction of host and microbial pathogens may differ significantly (Van Der Logt and Hathaway 1997:95; MoH and MAF Food Harmonisation Project June 2000:17). Because of these factors, lack of information and a lack of a detailed conceptual framework have inhibited the development of appropriate microbiological risk assessment models to date. In the short term, therefore, most microbiological risk assessments are likely to have a qualitative base (Van Der Logt and Hathaway 1997:96).

Hathaway (1997:1432) argues that it is not possible to achieve ‘a notionally zero risk baseline’ of microbiological hazards, as can be achieved with chemical contamination. The objective of microbiological risk analysis is simply to reduce microbial risks to ‘the minimum which is technologically feasible and practical’. In an international food safety environment in which application of a risk assessment approach is a specified regulatory activity, he says that governments are therefore advised to actively combat the public’s desire/perception of ‘zero risk’ for all food and unrealistic expectations of the effectiveness of regulatory action. In fact, Hathaway (1997:1434) argues, ‘there is no zero-risk: if a hazard exists, there is some probability that it will cause an adverse effect, no matter how small’.

Risk Management

MAF explains that risk management for the purposes of food safety is the process of weighing policy alternatives, in consultation with all interested parties. Risk management provides a framework for considering health risks and other factors relevant to the protection of consumers and the promotion of fair trade practices. Prevention and control measures are instituted to the extent they are deemed appropriate. Risk managers must therefore make a decision about what they consider to be an ‘acceptable’ level of risk (Hathaway 1997:1433; Jolly, 1997; MoH and MAF Food Harmonisation Project June 2000:6). Jolly (1997) says that:

Risk management involves both the identification of the standards of acceptable risk appropriate to different types of food hazards, and the establishment of procedures to ensure that the risks are kept within the limits set by those standards. It has to be recognised different risk management approaches may produce the same food safety outcomes, equivalence of outcomes as opposed to measures, is what is relevant.

HACCP and Risk Assessment Models

Hazard analysis critical control point (HACCP) systems are a central component in risk assessment and food safety. HACCP is focused on hazards to human health known as ‘critical hazard points’, a production process where food can be contaminated or where contamination can be controlled or eliminated. MAF explains HACCP using the definition provided by the Codex Alimentarius Commission (Codex),¹¹ which states that HACCP is ‘a system which identifies, evaluates, and controls hazards which are significant for food safety’ (Hathaway 1997:1434). This definition does not distinguish between the control of hazards and the control of risks. However, MAF says that any hazards considered must be of ‘such a nature that their elimination or reduction to acceptable levels is essential to the production of safe food’ (Hathaway 1997:1434). Similarly, they point out that application of a decision tree to identify critical control points (CCPs) includes consideration of the question, ‘could contamination with identified hazard(s) occur in excess of acceptable level(s), or could these increase to unacceptable level(s)?’ Hathaway says that the concept of an acceptable level of risk is implied but not elaborated in the Codex HACCP guidelines, yet consistent decisions

¹¹ Codex food standards set safety minimums and are, according to MAF, designed to protect human health while not unnecessarily restricting trade (MAF Food Assurance Authority 2000). Codex coordinates this role with the Food and Agricultural Organization (FAO) and the World Health Organization (WHO).

on CCPs and critical limits will rest largely on application of a practical and systematic risk analysis process (Hathaway 1997:1434).

Control of hazards involves decisions regarding ‘acceptable’ levels (especially of contamination) at each process step, explain Van Der Logt and Hathaway (1997:95), and there is a presumption that the critical limits utilised in the HACCP plan will bear a quantitative epidemiological relationship with outcomes in terms of food safety. There is therefore an inescapable requirement for some form of risk assessment if a HACCP plan is to be genuinely applied, and consistent decisions on CCP’s and critical limits will largely rest on a practical and systematic risk analysis process. Although HACCP-based food control systems are often justified solely on the basis of being able to reduce or minimise *hazards* during one segment of the food production/processing system, it is contended that assigning critical limits on this basis alone will often be insufficient; the goal of a HACCP system should be to significantly reduce the *risk* of food-borne illness (Van Der Logt and Hathaway 1997:95).

HACCP then is considered important because it focuses on preventative measures rather than end product testing. MAF argues that monitoring the entire production process will ensure that ‘food is produced in the safest possible way, and that all potential hazards (e.g., micro-organisms, chemical hazards and physical hazards) are either prevented or reduced to negligible levels’ (MAF 2000b).

1.8 Implementing, monitoring, and policing RMP

Proponents of risk management argue that RMP enables the meat industry to be efficient, flexible, and competitive. RMP is preferred because it is a system based on substituting business management practices for government bureaucracy (Gavan Herlihy 1998; *Animal Products Bill* 1998:1). Risk management systems focus on the documentation and auditing of safety procedures related to livestock, meat, and plants, rather than on the ‘hands-on’ visual inspection by government officials. While the government is still responsible for deciding on the appropriate level of risk, and for setting standards and specifications in accordance with this decision, the intent is to ‘set standards, strategies, regulatory and operational policy in full consultation with stakeholders namely the meat industry themselves (MAF 2000a).

The meat industry itself is responsible for developing and implementing RMP to counteract the particular risk factors that they have identified. So long as the resulting products are ‘fit for intended purpose’, that is, food consumption, then they have MAF’s approval. Under the Act all RMPs must adhere to the principles of HACCP because process control and supporting systems are the key means of controlling identified hazards and other risk factors. But no specific programme is mandated for the entire industry. Good risk management practices are seen to vary ‘depending on the materials used, the processes applied and the products produced’ (MAF Food Assurance Authority 2000). As long as individual company RMP plans meet the government’s risk management standards, then what they entail and how they are implemented is left to the discretion of the companies themselves (MAF 2000a; MAF Food Assurance Authority 2000). The government hopes that by ‘taking a more active role in the design of food safety programmes, companies have the opportunity to be more innovative and competitive’ (MAF Food Assurance Authority 2000).

The individual meat industry operator is responsible for determining that their RMP meets the food safety standards. All RMP must then be independently evaluated (MAF Food Assurance Authority 2000). John Miller from the Meat Industry Association (MIA) explained that the government-employed evaluator has to consider the total documentation and say, *‘if the systems this describes were put in place will it insure that all the food coming out meets the requirements, whether they are technical or quality aspects?’* To do this, the evaluator has to understand all the relevant operations of the plant; for those aspects with which they are not familiar, such as refrigeration or water systems, they are required to find somebody who does know about them to assist them in the evaluation process. Once an evaluator has approved the RMP it is the responsibility of MAF Verification Authority (MAF VA) to certify the performance of RMP on an ongoing basis. MAF VA veterinarians verify that the company has met all the necessary requirements and that the meat inspectors (currently organised through Asure NZ Ltd) are doing their inspections correctly. While the VA inspectors will physically go out onto the chain and check physical structures (such as whether the meat chillers are the right temperature) the verification is predominantly paper-based. The primary role of VA inspectors is to check the company’s records to make sure that procedures have been carried out to the appropriate standard.

With the introduction of RMP all domestic companies will operate under a performance-based verification system. Under this system, how well a company complies with its own

RMP affects how frequently it is visited by MAF VA (Dobbie 2001; Cassidy 2001). In the domestic red meat sector, for example, veterinarians are no longer employed permanently onsite to do verification (this was never the case with poultry). Instead they work on a calling cycle, which means that a meat plant may only receive a visit from the veterinarians once every six weeks to verify that procedures are being adhered to (Dobbie 2001). In the export sector, the EU requires that New Zealand meat plants that export to EU member states have a veterinarian on site at all times while processing. The USDA requires that at their sites a veterinarian must be available at all times, although they do not have to be physically on site. These requirements by the EU and the USDA make it unlikely, except in the domestic sector, that efforts to open up the verification process to contestability from the private sector to further reduce costs for business will be successful (Dobbie 2001, Davidson and Miller 2001, Pearson 2001).

Finally, operations under RMP will be subject to a government audit that will vary in intensity and frequency depending on business performance (MAF 2000a). The auditor audits the MAF VA veterinarian who verifies the implementation of the system. Again, the government would like to see the auditing process made contestable, however, this is only likely in the domestic sector.

MAF explains that, since government has the role of setting standards, then a key decision for them is to determine on behalf of society what level of risk society ‘is prepared to accept in return for the benefits to be derived’ (MAF 2000a). Food safety factors are just one factor to consider in their assessment. As MAF (2000a) explain, the main criteria for deciding on the appropriate level of risk depends on several factors including: what tools are available to manage the risk and their efficacy; the costs and benefits of managing the risk; and social (such as employment) and environmental (such as use of chemicals) factors’ (MAF 2000a).

1.9 Chapter outline

The rest of this thesis is organised into a theory and methodology chapter, two substantive chapters, and a concluding chapter.

Chapter Two outlines the conceptual framework of actor-network theory that I have adopted. My central assertion in this chapter is that the construction of risk and standards in relation to food safety can be seen as the product of a network of heterogeneous materials. I am

interested in how MAF as the central actor in relation to RMP constructs interests, enrolls allies and mobilises resources in order to achieve some preferred outcomes.

Chapter Three outlines my methodological approach to my research, which flows from the theoretical framework of actor-network theory that I intend to use. Therefore, for purposes of my research, I 'follow the actor', in this case MAF, which is the central actor constructing a new network around RMP. The chapter involves a discussion of the methods used to collect my data and how that data was analysed.

Chapter Four examines how MAF sought to construct a new network around RMP and the New Zealand standard in the meat sector. The chapter focuses on the arguments and methods that MAF put forward to win the various actors to support RMP.

Chapter Five illustrates how the various actors within the network disrupt MAF's worldview as it is laid out in chapter four. This chapter is based on the interviews conducted for this research and it is this data that illustrates my argument that how RMP and the New Zealand standard gets constructed is a negotiated and contested process.

Chapter Six concludes the thesis by examining the value of using the conceptual framework of actor-networks to examine the construction of RMP and the New Zealand standard. As well, I point to those areas that I think are of value for further research.

Chapter Two

Risk as the Product of Actor-Networks

'Judging the equivalence of different food control systems in different countries using a scientific and risk based process is necessary to both ensure scientifically robust food standards and protect New Zealand's trade interests'.

MAF Food Assurance Authority, 2000

2.1 Introduction

The Ministry of Agriculture and Forestry (MAF) argues that the development of scientific risk management programmes (RMP) will improve meat safety and put the New Zealand meat industry in a strong position to reject what seem to be non-scientific, politically motivated regulations imposed by international competitors. These regulations were viewed by MAF as little more than trade barriers implemented under the guise of hygiene and meat safety. Standards for managing risks, MAF believed, would allow meat companies in New Zealand to reduce their production costs and remain competitive without compromising food safety.

The objective of this chapter is to develop a conceptual framework for analysing the science of RMP. This framework will be used throughout the following chapters to critique MAF's understanding of RMP as objective, rational, and 'based on scientific principles' (McKenzie 1999). To do this, I will first analyse MAF's position of how the science of risk assessment and risk management in relation to food safety is established (which was presented in more detail in Chapter One). Following from this discussion I will outline my argument that draws upon the framework of actor-network theory. From this framework I will argue that risk in relation to food safety is better understood as the product of networks made up of human and nonhuman actors. The content of RMP and the way in which they are implemented is constructed, negotiated, and contested by the different actors in the network.

2.2 MAF's position on risk in relation to food safety

In their discussions regarding applying RMP for dealing with hazards to human health in meat MAF officials clearly distinguish between identifying the difference between a 'hazard' and a 'risk'. They explain that a hazard is a biological, chemical, or physical agent in food that has the potential to cause an adverse health effect in consumers. Risk, on the other hand, is a function of the probability of adverse health effects, the severity of those effects on the population consuming the food, consequential to a hazard(s) in food. (Hathaway 1997; Jolly 1997; MoH and MAF Food Harmonisation Project 2000). Risk assessments, therefore, are viewed by MAF as primarily a scientific process whereby an evaluation takes place to assess the probability of occurrence, and the severity of any known and potentially adverse health effects, 'that result from human exposure to hazards in foods' (Hathaway 1997:1433; MoH and MAF Food Harmonisation Project June 2000:11).

From MAF's perspective risk in relation to food safety is an objective hazard or threat that exists 'out there' and can therefore be accurately measured in terms of its likely occurrence. Since these hazards already exist in nature and the risks associated with these hazards can be identified through scientific measurement and calculation then they can also be controlled using this knowledge (Lupton 1999:18). MAF's framework for risk assessment, therefore, presumes that the probabilities associated with the occurrence of particular hazards in relation to food safety are by and large 'objective, knowable, and quantifiable' (Tierney 1999:219). MAF accepts that risk assessment, like any process of human decision-making, invites an element of subjectivity. But the tendency for those involved in the risk assessment field, according to Bradbury (1989:382), is to treat the calculations that they produce 'as if they were "objective facts", or "absolute truths"'.

HACCP systems are a central component in risk assessment and food safety. The HACCP system focuses on hazards to human health known as 'critical control points' (CCPs). MAF says that any hazards considered must be of 'such a nature that their elimination or reduction to acceptable levels is essential to the production of safe food' (Hathaway 1997:1434). Hathaway says that consistent decisions on what are the CCPs in the production process and the critical limits will rely largely on the application of a systematic risk analysis process (Hathaway 1997:1434). Van Der Logt and Hathaway (1997:95) explain that since there is a presumption that the critical limits utilised in a HACCP plan will bear a quantitative epidemiological relationship with outcomes in terms of food safety then the control of any

hazard involves decisions on what are ‘acceptable’ levels at each process step. There is therefore an inescapable requirement for some form of risk assessment if a HACCP plan is to be genuinely applied, and consistent decisions on CCP’s and critical limits will largely rest on a practical and systematic risk analysis process.

An assessment of risk then is seen by MAF as an essentially technical matter that can best be measured by the development of accurate scientific information through the use of HACCP. Implementation of HACCP systems will then allow meat companies to make the most rational decisions regarding potential risks in their processes and their consequences for meat products. The emphasis therefore is on developing quantitative measures to identify, measure, characterise, and evaluate the ‘outcomes resulting from natural and technological hazards’ (Tierney 1999:217). These measures can then facilitate the meat companies to compare the risk outcome of different options available to them, and to calculate each of their costs and benefits (Gabe 1995:2).

Risk management for the purposes of food safety, according to MAF, is the process of weighing policy alternatives. Risk management must consider both the risk assessment process and other factors relevant to the health protection of consumers, and risk managers must make a choice about what is an ‘acceptable’ level of risk (Hathaway 1997:1433; Jolly 1997; MoH and MAF Food Harmonisation Project June 2000:6). Risk managers need to identify standards of acceptable risk that are appropriate to different types of food hazards, and they must then establish procedures to ensure that the risks are kept within the limits set by those standards (Jolly 1997:27). Hathaway argues that clear boundaries must be established between the ‘scientific process’ of risk assessment and any management decisions so that the science may remain objective. He is aware that while a successful risk assessment is most likely to include interactions with risk management, to protect scientific integrity ‘any scientific value judgements and policy bounds that are involved at particular decision points should be clearly identified and documented’ (Hathaway 1997:1435). Within this perspective any sense of ‘subjective’ influences in relation to risk, whether they be social, cultural, or political are seen as a distortion or bias that should be avoided.

In asking questions such as ‘What hazards exist?’ ‘What risks exist?’ and ‘How should we manage them?’ the assumption by MAF is that the risks involved in meat production are discoverable, measurable, and can be controlled with the appropriate skills and expertise (Gabe 1995:2). MAF’s main concerns in relation to the process of risk assessment are similar

to those identified by Deborah Lupton in her analysis of the scientific and technical literature on risk. Lupton argues that those involved in the risk assessment field focus on issues such as ‘how well a risk has been identified or calculated, the level of seriousness of a risk in terms of its possible effects, how accurate is the ‘science’ that has been used to measure and calculate risk and how inclusive are the causal or predictive models that have been constructed to understand why risks occur and why people respond to them in certain ways’ (Lupton 1999:18).

2.3 Risk as a socially constructed phenomenon

Social scientists have raised important challenges to the idea that risk can be viewed as a purely objective phenomenon. Considering the social and cultural context in which risk is perceived its nature and magnitude is far more variable than the cognitive and technical sciences allow (Clarke 1993:379). Here, risk is understood as something *constructed* through the interaction of groups and individuals who are situated differently in society and therefore tend to have different perspectives on the hazards they face. What we ‘measure, identify and manage as risk’ (Lupton 1999:30) is not determined through the natural world but rather reflects these various social interests and ‘their differential capacity to mobilise resources in the course of debate and controversy’ (Law 1987:111). So while MAF’s views on risk present ‘expert’ views of risk as essentially ‘objective’, ‘value neutral’ and ‘unbiased’, social constructionists regard them as ‘being equally as constructed through implicit social and cultural processes as are lay people’s judgements’ (Lupton 1999:30). Lupton (1999:30) argues that social constructionists always view the entire risk assessment process, as with any form of knowledge, as influenced by value choices. Therefore, risk cannot be viewed as a ‘static, objective phenomenon’, but rather something that is ‘constantly constructed and negotiated as part of the network of social interaction and the formation of meaning’ (Lupton 1999:30).

From this perspective, attempts to obtain more accurate assessments of the risks people are exposed to are futile. Social constructionists seek instead to unmask the appearances of objectivity in order to explain how and why risk is manufactured in particular ways. Social constructionists assume that hazards exist and that these can be identified, but their focus is on explaining ‘how social agents create and use boundaries to demarcate that which is dangerous’ (Clarke 1993:379). Probably one of the most valuable questions that constructionists raise is: Who does the constructing? (Clarke 1993:380). Explanations of how

the concept of risk is assessed, created, and allocated must therefore focus on the role of politicians, and economic and institutional interests (Tierney 1999; Clarke 1993). Tierney (1999:219) argues that it is these social forces that social scientists need to focus on in order to analyse how risks and hazards are constructed, how peoples' views regarding risks and hazards are shaped, and how risk is produced and allocated. Following from this, Reiss (1992) says that sociologists should ask: Why are some risk estimates legitimated instead of others? In this sense it is necessary to understand 'the processes through which some conceptions of risk, rather than others, come to be viewed as valid, and by whom' (Tierney 1999:222-223). In the context of evaluating RMP in the New Zealand meat industry the questions raised by social constructionists are relevant for examining the social, political, and economic contexts to help identify who is constructing RMP, why this is occurring now, and who will benefit from this process.

2.4 Science and risk as the product of actor-networks

MAF presents risk as an objective, scientific process based on the natural world while social scientists, such as Clarke, Reiss, and Tierney, focus on the importance of social context for understanding risk. One of the problems with these two positions is that they present society and nature in a dichotomous relationship, either society constructs risk or risk assessment is based on real hazards that exist in nature. Michel Callon, Bruno Latour, and John Law, however, have sought to overcome this division. They oppose arguments that grant either humans or nonhumans preferential status advocating instead the concept of 'symmetry', whereby both nature and society are viewed as the product of *network building*. The principle of 'symmetry' says that all entities, regardless of their subject/object status, should be treated equally within the heterogeneous network (Hess 1997). The concept of heterogeneity in this sense is defined as the mixture of both human and *nonhuman* actors within a network.

So how are heterogeneous networks defined? Callon and Law argue that entities, whether they are human or nonhuman, are not discrete subjects or objects with clearly defined boundaries. This is because you cannot clearly separate any individual one of them from their context because they are each sets of relations, in the form of networks. They argue that the form, content, and properties of entities are not fixed. Rather 'their identity emerges – and changes – in the course of interaction' (Callon 1997:171). Objects, people, texts, and devices are 'processes of transformation, compromise or negotiation' (Callon 1997:171). Callon says that if we examine closely how scientists do their work, how scientific statements are created,

and the way that technological artefacts are constructed, then we can explore how the various elements within the network are brought together and the way that individual entities, whether they are people, technologies, or texts, are able to 'summarise the relations that make them up' (Callon 1997:170). These entities are 'compound realities', or the result of a process known as 'translation', (Callon 1997:170), which I return to below. The shape and stability of science and technology therefore is the 'function of heterogeneous [social, natural, and technical] elements as these are shaped and assimilated into a network' (Law 1987:113). In other words, 'things' in and of themselves carry very little decisive weight; it is only when we can mobilise and multiply together all of the texts, the inscriptions, the instruments, the skills and so forth, that networks are able to expand and become stronger, and as this process unfolds 'knowledge claims become more accepted (more 'factual') and technologies more successful' (Hess 1997:109).

While this perspective has predominantly been used to examine science and knowledge, my study extends the concept of actor-networks to an examination of regulatory systems. Here the creation of RMP within the meat industry is seen not as the product of a privileged scientific method nor as something that is constructed by social actors alone. Rather it is the result of human and nonhuman actors that have been juxtaposed into a network. Some of the key actors that are important to consider in this process include: the organisation of MAF, export meat companies, domestic abattoirs, foreign commercial customers, scientists, consumers, the *Animal Products Act*, foodborne pathogens, microbiological swab tests, and microbiological databases:

Nonhuman Actors

One of the most controversial aspects of actor-network theory is its positioning of nonhumans as 'actors'. Actors, or actants as they are also referred to, are defined as either any entity endowed to act or 'whoever or whatever is represented' (Callon 1994:53; Latour 1987:84). By representation Latour means that someone is designated 'as a spokesperson for an actant (another person, object, institution, or network)' (Hess 1997:108). In classical Parsonian social theory, action entails a stated goal or intention, and in this sense 'nonhuman entities cannot be actors because they do not have intentions and goals' (Hess 1997). However, the degree to which writers who use this theory grant a causal role to nonhuman entities and their ability to constrain or resist within the network varies a great deal (Hess 1997:108). My study most closely resembles that of De Sousa and Busch (1998:350), who do not argue that nature

and technology as actors are purposeful but that they ‘must be taken seriously as acting in the same world as we humans and as mediating many human relations’. In this sense the term actor or actant for nonhuman entities is an attempt to ‘give a name to the common processes whereby things are endowed with an ability to influence human actions through delegation or representation’ (Hess 1997:108).

It is important to recognise that one of the key defining characteristics of human society is the ways and means that nonhuman materials and objects are incorporated into and are an essential part of our ‘social’ networks. Law (1992:381) explains that since ‘almost all of our interactions with other people are *mediated through* objects’ the relationship between human and nonhuman materials is essential to creating social relations. This point has been highlighted by contrasting human society with that of baboons. Shirley Strum (1987), for example, explains that there is no such thing as a social life without the participation of nonhumans, ‘especially machines and artifacts’, and that ‘without them we would live like baboons’. Callon (1981:283) explains that if we want to stabilise society then it is necessary to ‘bring into play associations that last longer than the interactions that formed them’, therefore technology can be viewed as social relations made durable (which I come back to later on). In contrast, relationships within baboon society are organised around purely somatic resources and this limits the type of societies and social relationships that they can build (Callon 1997:168). As Callon (1997:168) explains:

If you want to be leader in baboon society you cannot mobilise walls, rifles or social security numbers. You have no secret police. All you have is your own body. If you want to be chief, you have to be there in person in order to reproduce your authority. There are no other materials involved. There are no texts or artifacts and no money circulates. But human societies are different. They are made up of heterogeneous materials. So what we call ‘the social’ is materially heterogeneous. All these elements and materials participate in social ordering.

Immutable Mobiles

In order for networks to create the effects of agency, organisation and power, they must embody a set of relations in durable materials known as *immutable mobiles* (Law 1992:387). Materials and processes of communication must be durable to order social relations across time, and mobile to order social relations across space and act at a distance (Law 1992:387). By embodying risk management practices in, for example, written national legislation and industry codes of practices, specifications and templates, networks are able to make social

relations durable across time and space. Risk management practices are only enforceable, for example, if there exists a written body of rules that participants are expected to abide by. Perhaps too, participants might be required to sign agreements that state that they are willing to concur with these rules. To assent to these rules also requires textbooks, manuals, and other forms of documentation that sets out the methods and procedures that have to be followed. If the rules are ignored then financial penalties could follow. Through nonhuman actors then networks are able to act at a distance. There is no need for hundreds of individual MAF officials to be located across the country ensuring that their rules on food safety practices are being carried-out correctly because the nonhuman actors can do this for them.

In the process of constructing a new network of risk management practices for food safety, old local networks organised around food safety standards must be dismantled and an entirely new set of social relations must be established. The process of implementing MAF's risk management system is simplified because the knowledge that it contains possesses the 'characteristics of mobility, stability, and combinability', which is essential if these practices are to be effective nationally (De Sousa and Busch 1998:352). To possess these characteristics knowledge must be transformed from a mutable immobile to an immutable mobile (Latour 1987). De Sousa and Busch (1998:352) explain that an immutable mobile is knowledge that is 'coded, drawn, mobilised, gathered, transported, archived, recalculated, and displayed'. Once this process has been carried out risk practices are ready to be easily accessed and used by networks. On the other hand, many practices for ensuring food safety are based on individual, family, or local knowledge, and therefore tend to be localised and limited – they are 'mutable immobiles'. Without the knowledge that they contain having been gathered together, coded, written down, or displayed, for example, they are not easily transported (Law 1992:367). Other networks cannot easily access this knowledge and make use of it for themselves.

The concept of immutable mobiles is central to understanding, from an actor-network viewpoint, how micro-actors become macro-actors. In other words, how does an actor 'generate the effects of agency, organisation and power' and how is resistance from other actors within the network overcome? (Law 1992:387). Callon (1981:284) explains that the difference in relative size and strength is reached when a micro-actor is able to include within the network not only other humans but also the greatest number of durable materials. He says that 'by associating materials of different durability, a set of practices is placed in a hierarchy

in such a way that some become stable and need no longer be considered'. By incorporating more durable elements into the network then weak, reversible interactions can be replaced by strong interactions and instead of multiple possibilities and directions actions must head in certain directions, through particular actors (Callon 1981:287). Durable materials maintain their relational patterns for longer, thoughts or speech, for example, quickly pass but when relations are embodied 'in inanimate materials such as texts and buildings they may last longer' (Law 1992:387). Therefore, 'a good ordering strategy is to embody a set of relations in durable materials' and what we find is that relatively stable networks are those that are 'embodied in and performed by a range of durable materials' (Law 1992:387). However, the effects of durable materials are not constant and they will change when they are situated in new networks of relations (Law 1992:387).

In the process of being coded, transported, displayed, and so forth, immutable mobiles become 'black boxes'. This is a scientific term. A technoscientific product, such as a RMP, is referred to as a 'black box' when all of its internal complexity has become invisible. Once RMP have been black boxed, the focus remains only on 'its inputs and outputs and not on its internal complexity' (Latour 1999:304), which are now viewed as no longer necessary to consider. Since the contents of the black box have become a matter of indifference all of the debates and questions that surrounded it initially are brought to an end. As well, once a particular set of practices in relation to meeting food safety standards have been black boxed then all other practices cease to be of interest. De Sousa and Busch (1998:352) argue that it is extremely difficult to reopen a black box because it requires 'resources at least as great as those used to close it' to reopen it.

2.5 The sociology of translation

Social structures and change, including the construction of RMP, can only be accomplished through the process of creating networks made up of both human and nonhuman entities. In other words, MAF cannot accomplish their goals without drawing on the strength, skills, and resources of others. The meat industry network, however, is made up of heterogeneous elements who often have their own goals and inclinations. The export meat companies, for example, are concerned about profitability and market access, ANZFA scientists are concerned about setting food safety standards that will both protect the viability of business and consumers health, and meat inspectors want to ensure meat companies' compliance with hygiene regulations. How then can MAF mobilise, organise, and hold together all of these

various entities that make up the heterogeneous meat industry network and organise them into 'a punctualized actor', an actor with a common goal and common interests? (Law 1992:386). It occurs through a process of *translation*. Callon and Latour (1981:279) explain that translation is the process of 'negotiations, intrigues, calculations, acts of persuasion and violence' whereby an actor, such as MAF, comes to represent and speak or act on behalf of other actors. To successfully implement RMP all of the various interests of the actors must be translated into a common will. What is important is not to fix these interests to a particular actor *a priori* but instead to examine how these interests get translated.

The concept of translation is about the interaction that takes place between actors that produce alliances that support one set of objectives rather than another within the change process. MAF must construct interests, enrol allies and mobilise resources in order to achieve its preferred outcome of risk management. The various actors within and tied to the meat industry cannot be drawn into the network if they do not believe that their interests will be served. At the same time, however, those interests must shift if particular goals are to be met since nothing would be accomplished if each actor followed their own individual interests. Latour says that translation is about the actions that actors use to 'modify, displace, and translate their various and contradictory interests' (Latour 1999:311). The process of 'translating interests means at once offering new interpretations of these interests and channelling people in different directions' (Latour 1987:117).

Each of the actors within the New Zealand meat industry has different goals in relation to the issue of meat safety standards. The government, for example, is interested in reducing their role in policing meat inspection and passing that responsibility to the companies themselves. The major meat export companies are concerned about their ability to remain competitive and profitable in the world market. Therefore, they are interested in anything that can reduce their costs in relation to meeting meat safety standards. Consumers want assurances that the meat that they consume from New Zealand is safe. The Ministry of Health wants to reduce high levels of foodborne illnesses. While each actor has their own particular goal MAF believes that each of them can be translated into one common objective, which is risk management. MAF argues that through the introduction of RMP each of their goals can be met.

Through the translation process a particular actor, who in this case is MAF, makes itself indispensable by defining the issue of risk and food safety standards in such a way that other actors come to accept their definition of the problem. MAF can do this because, as I explain

in the next chapter, they have the resources, the expertise, and the finances to access the research of others, as well as developing their own (see Steve Hathaway), into the field of risk in relation to food safety. In so doing MAF established themselves and their knowledge claims as *obligatory points of passage*, whereby others within the meat industry end up with few choices but to align themselves with MAF and accept their knowledge claims if they want to solve their own problems. In Callon's terms, 'We [read MAF] want what you want, so ally yourselves with us by endorsing our research and you will have a greater chance of obtaining what you want' and in the process MAF have made themselves indispensable within the network (Hess 1997:109). It is through this process of translation that an actor-network is constructed. But as the process should illustrate it is always a network of constrained relationships and the consensus and alliances within it can be contested at any moment (Callon 1999:79).

2.6 Conclusion

I have argued in this chapter that an effective way to examine the construction and implementation of RMP is through the concept of actor-networks. This framework is useful because it rejects the idea that science is either the sole domain of nature or society. In other words, risk is not based simply on an objective, value-free reality nor is it solely socially constructed. Rather, I think that risk is better understood as the product of both human *and* nonhuman elements from the meat industry that have been enrolled into a network by MAF. The more actors that MAF can win into its network surrounding risk then the more likely it is that it can successfully implement RMP since there will be fewer stakeholders outside the network to resist the concept. At the same time, which particular actors MAF is successful in drawing in will reflect how RMP will be constructed and what its content will look like (see Chapter Five). MAF has to convince the various stakeholders in and around the meat industry, who have their own particular interests concerning meat safety standards, that their individual interests can best be served through supporting RMP. How MAF works to 'translate' these interests and construct the network is the subject of Chapter Four.

This chapter began by providing a brief summary of MAF's position on risk. It is important to understand how MAF explains the concept of risk as the aim of this thesis is to explore their assertion that risk assessment and risk management is the product of an objective, scientific method. To unpack this argument requires a conceptual framework that will allow me to achieve this. I believe that authors such as Clarke, Gabe, and Tierney have rightfully

put to the fore the importance of recognising the social, political, and economic context as playing a central role in establishing what the content of risk consists of. They have provoked social scientists to ask important sociological questions when confronted with an apparently scientific process of risk assessment, such as: Who is involved? What are their interests? Why are some risk assessments chosen and not others?

As I explain in the next chapter the best way to understand this process of network building is to ‘follow an actor’. In my study I intend to follow MAF as the key player involved in this process. This method will allow me to examine some of the details and controversies over how ‘facts’ surrounding RMP are negotiated and contested. Following MAF will also allow me to unravel the process of translation, that is all of the arguments, resources, and devices that MAF uses to try to win the various actors in and tied to the meat industry into the network of RMP and keep them there.

Chapter Three

Examining the Research Process

'I am confident that the Bill will enhance consumer protection, improve the effectiveness and efficiency of the risk management system, assist New Zealand's competitiveness, and safeguard international market access'

Hon. John Luxton, Minister for Food, Fibre, Biosecurity and Border Control, 1998

3.1 Introduction

The Ministry of Agriculture and Forestry (MAF) argues that the development of scientific risk management programmes (RMP) will facilitate the creation of a single New Zealand meat safety standard. MAF believes that the creation of a single standard will end the disparity in standards that currently exists between the export and domestic meat sectors. At the same time a New Zealand standard based on RMP is expected to put New Zealand meat companies in a strong position to win acceptance from their international trading partners for the New Zealand standard, since they could argue that it is based on scientific procedures. It is also expected that this process will both reduce production costs and improve New Zealand's ability to access foreign markets.

MAF's vision of a harmonised framework for food safety based on scientific risk management seems straight-forward if we assume that science is generated through the practice of known scientific methods, however, if we acknowledge science as a product of networks of human and nonhuman actors it is much less so. My thesis argues that the construction of scientific RMP for meat safety is a collective process, a network effect. Consequently, the content of RMP is dependent on the allies, both human and nonhuman, that are collected together to support particular claims. These include, for example, the *Animal Products Act* 1999 (APA), food technologists, overseas customers, *e-coli*, veterinarians and HACCP plans. The content of RMP and how it is implemented occurs through a process of translation (Latour 1987). Translation refers to the interaction that takes place among actors that produces alliances that support one set of objectives, such as RMP,

rather than another. Actors, such as MAF, must enrol allies, construct interests, and mobilise resources in order to achieve their preferred outcome of RMP.

An effective way to examine the implementation of RMP and the New Zealand standard was not to assume that there was some objective knowledge ‘out there’ waiting to be discovered, as MAF argues, but rather to explore how science is constructed by ‘following an actor’. I believed that the methodological approach of following an actor would give me some important insights that I could not achieve through an alternative method. In particular I thought that this approach would allow me to characterise all the human and nonhuman elements that were part of the network of risk management; it would help me to follow the arguments that were used to win these actors to the network; and finally, it would allow me to understand how the network that was constructed was able to generate an effect, such as RMP.

The first stage of my research was to conduct a textual analysis of all the written material that was publicly accessible that discussed risk management and food safety in New Zealand. These documents fell into four broad categories, which were 1. Government legislation; 2. Material published by government ministries; 3. Documents on risk management and food safety published by other stakeholders, such as the meat industry; 4. Popular media reports on this topic. In this process I was able to build a picture of who the main actors were and what quickly became apparent was the overwhelming dominance in the literature of MAF in relation to the other stakeholders. From my first assessment of this data it was apparent that MAF was leading the discussion on risk analysis and that they were at the forefront of attempts to build support for the concept of risk management in the meat industry. Based on this assessment I decided to follow MAF as my primary actor. MAF’s position on risk predominated in these documents and their material presented the notion that there was unanimity among all the stakeholders regarding their concept of risk and their assessment of why a system of risk management was necessary in the meat industry.

Following from the document analysis my next approach was to conduct semi-structured interviews with some of the key stakeholders.¹² An approach of following a particular actor does not preclude examining the role of the other actors within the network. My interest in

¹² See Appendix A for a complete list of the participants.

the interview process was to explore the views of other actors in relation to risk management and what their relationship was with MAF and the other actors in the network in terms of implementing risk management. I also wanted to test the harmonious view of risk that MAF put forward in their literature. It was on this methodological basis that I intended to examine how scientific RMP for food safety were negotiated, constructed, and contested by actor-networks in the New Zealand meat industry.

3.2 Document analysis

The significance of food safety issues and their growing priority in New Zealand is reflected in the surge of legislation that emerged in the later half of the 1990s. This legislation includes the *Food Act 1996*, the *Animal Products Act 1999*, and the *Food Amendment Bill 1999*. Since the Bills, the Acts and the parliamentary discussion surrounding them are publicly available, they provided a point of entry to the issue of meat safety. I focused on the APA, because it is the act that introduces RMP into the export meat sector. While these materials produced only limited details on the individual actors involved in the process, they were sufficient to allow me to begin to identify the networks they were involved in. I was able to do this because the legislation outlined which stakeholders would be affected. The APA, for example, requires that all primary processors and some secondary processors of animal products must establish RMP, but the Act can only be made to apply to those animal products destined for the export market (*Animal Products Act 1999:15*). As well, these documents were valuable because they provided the government's point of view of what changes were taking place, why these changes were needed, and what they hoped to achieve through the process.

Since my thesis explores the role of nonhuman entities, I was interested in analysing documents in terms of their role as actors within the network. The APA, for example, is an important actor in terms of mediating social relations between the government, MAF, and the meat industry. By embodying risk management practices in written national law, for example, networks are able to make social relations durable across time and space (Law 1992:387). Risk management practices are only enforceable if there exists a written body of rules that all participants have access to and are expected to abide by. In this sense the network surrounding MAF is able to act at a distance through the enrolment of nonhuman actors such as the APA. Other texts, such as risk management templates, serve a similar function but since RMP are still in the process of being constructed, my research on this was very limited.

By far the most comprehensive coverage of risk management and its relevance to meat safety in New Zealand comes from MAF and more particularly a subgroup within MAF responsible for food safety matters – the MAF Food Assurance Authority. MAF explain that this group was set up to provide assurances to consumers both in New Zealand and internationally by managing food safety and related risks for New Zealand's primary food industry and exports. Officials within the Food group have written extensively on risk management, why the legislative changes were necessary, and how these changes will benefit both the meat industry and consumers. Most of this information is available online. An aim of MAF has been to assist the meat industry to reduce costs by communicating and operating as much as possible electronically and this has produced one of the most sophisticated and publicly accessible government websites. MAF have also used industry journals, such as *Food Technologist in New Zealand*, the *New Zealand Meat Producer*, and *Dairy Exporter* to publicise their views on risk and food safety.

Overwhelmingly then, the written documents that I have analysed are produced by the MAF Food group. Examining these documents soon highlighted both their value and their limitations. As the central advocate of the proposed changes, analysing MAF's position is crucial. Top officials, such as Andrew McKenzie and Steve Hathaway, have spent the last decade advocating risk management. A sense then of where the discussion began and why MAF became convinced of its importance can be found in these articles. As well, since MAF dominate the discourse on risk and meat in New Zealand, it is their proposition of scientific RMP that I needed to examine. Understanding their position is also important because their material sets the context for the discussion and debates surrounding meat safety and stakeholders within the meat sector and food safety are obliged to respond in some way to the paradigm that MAF has established. The literature that MAF produces is particularly insightful since it is not only about informing stakeholders about the changes but also about convincing and winning them to their position on risk management. As a consequence, however, this literature does not deal with the problems, concerns, doubts, or questions that have been raised by any of the stakeholders.

To find these I turned to the meat industry to see how they were responding to the new framework of risk and meat safety and what the major issues confronting them were. I began searching online and in libraries for any publications, speeches, or press releases that had come from the industry or their industry representatives, such as the Meat Industry

Association (MIA) or the Abattoirs Association. What surprised and frustrated me was how little I found. The most significant item was the *New Zealand Meat Industry Strategic Direction: Towards 2006*, prepared by the New Zealand Meat Board, MIA, Federated Farmers and the Abattoirs Association in 1998. While not extensive, the document states that the authors' view dealing with food safety and science as one of their key issues and strategies. The search process was still productive, however, in that searching through their publications provided me with a good sense of who the actors in the industry were – how many companies there were, how big they were, where they were located, and what they produce. I was also able to establish who the organisations representing the industry were and what their particular functions were.

While many other so-called developed countries were battling with potentially fatal outbreaks of *e-coli*, bovine spongiform encephalopathy (BSE), and salmonella, New Zealand clutched firmly to its reputation as clean, green, and free from deadly food-borne pathogens. Before I went any further with my research I needed details on what New Zealand's status was in relation to meat safety issues and whether these issues were being discussed publicly. A database review of the popular media for the last ten years showed that only six major articles regarding food safety had featured in New Zealand's main newspapers or magazines. These articles indicate that while New Zealanders have not been confronted with any of the most fatally dangerous pathogens that exist elsewhere, what they have faced are some of the highest rates of campylobacter, salmonella, and leptospirosis in the developed world. These articles pointed to a view that the system for dealing with food safety in this country was antiquated and therefore largely ineffective. While a feature news article in 1993 discussed the proposed introduction of Food Safety Plans (the domestic food sector equivalent of RMP) I found nothing since that time that discussed any of the legislative changes. Once again I was struck by the general silence concerning food safety issues in New Zealand and the introduction of risk management.

3.3 The interviews

Document analysis provided the background for understanding the content of the proposed changes, what these changes were expected to achieve, and who these changes were going to impact on. However, the material was predominantly authored by MAF and so provided only a limited understanding of the views of other agents within the network that MAF was trying to build. In fact, one of the striking things about the material was the extent of agreement

about the proposed changes. In the discussions from parliament all the political parties supported the changes, with only a couple of Members of Parliament (MPs) raising concerns over some issues, such as third-party contestability. Similarly, the meat industry was publicly silent on the issue. These documents then presented the ideal picture of what MAF and some actors within the meat industry hoped to achieve with the introduction of risk management, however, I wanted to explore how the interactions and negotiations of the various actors were shaping risk management. The best strategy for accomplishing this was to approach the stakeholders themselves and talk to them about how the process was unfolding. It was through the interviews then that I hoped to get at the complexity, dissent, challenges, and confusion that surround and complicate RMP and the attempt to implement a New Zealand meat safety standard.

The interview data that I have used for my thesis was the product of interviews that were conducted with Dr. Keiko Tanaka while I was working as her research assistant. Most of these interviews were carried out in January and February 2001. Dr. Tanaka was examining the changes to the regulatory framework for meat standards in New Zealand as a local response to the increasingly globalised agrifood system. We conducted the interviews both jointly and separately and all participants were told that the interview material would be used by both our individual projects.

A review of the legislation, MAF publications, and industry material had provided a good sense of who the key stakeholders were that we should approach to interview. We drew up a list of individuals, organisations, and companies that we wanted to approach. Our goal was to speak with representatives who had some direct experience in relation to RMP or meat safety standards. We sent letters to the representatives we hoped to interview that explained what the purpose of our research was about and why we wanted to speak with them. The letter was then followed up with a telephone call to see whether the person was interested in being interviewed and if so, to arrange a time. Fortunately, there was a real interest in the work that we were doing and nearly everybody we approached made the time to meet with us¹³.

We felt that the best strategy was to organise semi-structured interviews lasting approximately one hour. Most of the interviews were tape-recorded so that the material could

¹³ Only the Minister of Agriculture, Bill Sutton.

be transcribed verbatim. The interviews largely all took place in the offices of the interviewees. The only exception was the farmer and the meat inspector, both of whom lived some distance from Christchurch and were interviewed by phone. We prepared questions focusing on particular themes that had emerged from our readings, but since we had discovered so little published material from the stakeholders, we were flexible in pursuing unexpected leads of interest that our participants might introduce.

The key themes for the interviews were:

- What role their organisation or company had in developing the APA?
- What linkages they had with other stakeholders that from the documentary evidence also appeared to be part of the network?
- At what stage were they at in implementing a RMP?
- What benefits or constraints had they faced in implementing these programmes?
- How would their role change as a consequence of introducing RMP?
- What meat safety concerns do they have?
- How they saw the introduction of RMP benefiting meat safety?

Since our goal was to interview representatives of some of the key interest groups within both the domestic and export sectors, then meat companies were a logical place to start. Our intention was to interview several of the major exporting meat companies. In Christchurch we interviewed representatives of PPCS Ltd and the Alliance Group, the two meat-processing plants that dominate the South Island. We interviewed ANZCO Foods Ltd in Wellington and the AFFCO Group in Auckland. Accessing domestic abattoirs was more difficult, since they only produce for the local market they are more dispersed throughout the country. Time and distance considerations meant that it was only feasible to interview the one local abattoir, Malvern Meats. This abattoir produces meat for the Canterbury, West Coast, and Nelson/Marlborough regions. Since many of the issues regarding domestic meat safety also impact on the poultry industry I interviewed a representative of the largest poultry producer in the country, Tegal Foods. We were especially interested in what involvement the meat companies had in developing the APA, as we wanted to get a sense of what value they saw the changes as having. Since mandatory introduction of RMP under the APA does not come into force until November 2002, companies were able to give us some valuable, if limited,

insights into how the process of implementing RMP was going and what sort of challenges they were confronting along the way.

Much of the outreach work that MAF has organised has been done through the official representatives of the different meat sectors. These organisations provide a link between the industry and MAF. We were successful in interviewing the majority of meat industry organisations, including the Meat Industry Association (MIA), the Meat Industry Standards Council (MISC), the Pork Industry Board, the Poultry Industry of New Zealand (PIANZ), Federated Farmers, and the Retail Meat and Allied Trade Association. Our appointment with Meat New Zealand in Wellington fell through at the last moment and we were unable to follow up due to time restraints.

In relation to the government, we were able to meet with representatives of both MAF Food and the Ministry of Health (MoH). Interviews were organised with two members of parliament both in their role as MPs but also their role as consumer advocates. Sue Kedgley is a Green Party MP and a long-time food safety campaigner. Ms Kedgley founded the Safe Food Campaign¹⁴, which is New Zealand's largest non-official consumers organisation and she had published the book *Eating Safely in a Toxic World*, which examines food safety issues in New Zealand. Phillida Bunkle, an Alliance MP, was Minister of Consumer Affairs and also a member of the organisation Safe who had spoken out publicly on the issue of risk management in relation to GMO foods.

We were also interested in interviewing representatives from those government organisations, state-owned enterprises (SOE), and regulatory bodies that are responsible for policing food safety. The clearly defined territory that each organisation is responsible for exemplifies the division that exists between the export sector and the domestic sector. Asure New Zealand Ltd was created in 1998 when MAF Quality Management was separated into two SOE – Asure and Agriquality. The purpose was to separate meat inspection services from regulation and verification, with Asure taking over the inspection side of the operation. Domestic food safety issues, such as those concerning poultry production and secondary meat processors, are controlled jointly between the Health Protection Unit for Crown Public Health and

¹⁴ Ms Kedgley appears to be the predominant voice within Safe, however, she explained to us that she had resigned as its organiser since becoming an MP. A supporter of Safe from Auckland explained to me that the group had largely existed around Kedgley and that now that she had resigned little was happening.

Environmental Health Officers attached to local government. These agencies are responsible for monitoring and enforcing the Food Hygiene Regulations 1971. As bodies responsible for ensuring food safety on a daily basis, we wanted to hear their views and concerns regarding both the old inspection procedures and the proposed new ones. Recent government documents related to food safety seemed to indicate that the role of these agencies would change significantly with the introduction of the new legislation.

We also interviewed a scientist, who is a food advisor with the Australia New Zealand Food Authority (ANZFA). This organisation was established in 1991 by the Australian and New Zealand governments as an independent, expert scientific body, to develop and maintain systems that regulate food in the two countries. ANZFA is responsible for developing food standards as well as a range of other functions, including coordinating national food surveillance and recall systems, conducting research, assessing policies about imported food and developing codes of practice with industry. My main initial interest was in finding out what ANZFA's relationship was with MAF, the MoH, and the meat industry in terms of setting food safety standards.

Another government organisation involved is the Institute of Environmental Science and Research (ESR), which is a Crown Research Institute. We initially hoped to interview three ESR scientists based in Wellington who jointly published an article in May 2000 on communicable diseases in New Zealand. This article (Orchard *et al* 2000) detailed the significance of pathogens in New Zealand that were causing food poisoning and it compared New Zealand rates of infections with those of other major OECD countries. Unfortunately, the authors were unavailable while we were in Wellington. One of them, however, Val Orchard, organised for us to meet with scientists involved in food safety issues at the ESR in Christchurch. The focus of our interview then turned to the expertise of the five ESR scientists and social researchers who met with us. Their expertise included HACCP and risk profiling. The interview also clarified the role that ESR scientists are expected to play as independent scientific experts who provide various services to Health Protection Officers in relation to food safety and Food Safety Plans.

Most of the challenges to the scientific nature of risk management have come from consumer organisations and we felt that it was important to gain an understanding of some of their key concerns. We met with the Consumers Institute, the largest and most well-known consumers' organisation in the country. The Institute is seen by some consumer advocates as only semi-

independent since it receives a small amount of funding from the government and also because it is a subscription-based organisation rather than a group of consumers who have come together around particular issues. Attempts to contact other consumer groups were unsuccessful. It appears that in New Zealand consumer organisations around food safety are rare (although there has been an increase of interest and activism around the issue of GMO in food). Kedgley believes that the lack of consumer activism in New Zealand is probably due to people here accepting the dominant view that this country's food supply is 'clean and green'.

The greatest number of actors who have responsibility for food safety are meat workers, meat inspectors, and farmers. While these actors are largely excluded from involvement in the decision-making process, the decentralisation of meat safety responsibility is central to RMP, and the implementation of RMP could not take place without their tacit consent. Instead of safety being tied to government meat inspectors, every individual along the meat chain 'from the farm gate to the dinner plate' are now expected to participate. Since these groups were largely excluded from the negotiation process, they were not the focus of my research. However, because those on the 'outside' often provide important alternative insights, I did decide to interview several representatives. Consequently, I individually interviewed a meat inspector employed by Asure, and a sheep farmer; Dr. Tanaka and I together interviewed three officials from the New Zealand Meatworkers' Union (NZMWU), the body that represents meat workers.

3.4 Data analysis

My approach to analysing the data from the documents and the interview transcripts flowed out of my conceptual framework that the introduction of RMP is the product of actor-networks. My task then in examining the data was to build a conceptual map of how I thought the network was being shaped. As I explained above, my approach for achieving this was to follow MAF as the key actor involved in constructing the network surrounding RMP. In tracing references to and from MAF, I originated my conceptual map in the period when MAF first began to advance the idea of risk management in the late 1980s. My task then was to trace which stakeholders MAF had sought to enrol within the network and explain why MAF believed that the support of these particular actors was necessary. For example, MAF's preliminary goal was not to enrol the New Zealand meat industry but rather to focus on international organisations and actors, such as Codex Alimentaris and the SPS Agreement.

MAF believed that the meat industry was unlikely to be won to the idea of risk management without the support of some important international players. To see how MAF was able to construct a broad network of actors with various interests I worked through the arguments that MAF had used to convince the different stakeholders why it would be in their interests to support risk management and how RMP would help them achieve their individual goals.

While I chose to follow MAF as the dominant actor I had to be open to following the stories of our interviewees, which ensured that my understanding of the network was broadened in terms of who all the major actors involved were, what role they were playing, and how they were influencing and shaping risk management. The method of following MAF as a key actor was a crucial tool for understanding its network and how it was constructed. However, I did not bind myself to simply looking only at material that was related to MAF. Once the interviews with industry stakeholders began, for example, discussions often centred around their relationships with actors besides MAF that these companies considered to have a significant influence on how they organised their food safety regime. In fact, the focal point of many of these discussions was the relationship that the export meat companies had with their trade partners and international customers.

As I moved further into the interview process, it became apparent both that risk management is highly contested and that nonhuman actors played a central role in negotiating, implementing, and policing it. Therefore, my goal in analysing the documents and the interview transcripts was to consider what were the key nonhuman actors that emerged from the texts, what their relationships were with other human and nonhuman actors within the network, and what their role appeared to be in shaping the content and implementation of risk management and the New Zealand standard.

Chapter Four

Constructing the Network

'We had a lot of consultation with MAF, although MAF still went ahead and did exactly what they wanted to do.'

Anonymous meat industry representative.

4.1 Introduction

A central objective of this thesis is to explore the assertion by the Ministry of Agriculture and Forestry (MAF) that risk assessment and risk management are the products of an objective, scientific method. My argument is that the way risk assessment and risk management programs in the New Zealand meat industry are constructed, implemented, and monitored is better understood as the outcome of networks made up of both human and nonhuman actors. To demonstrate this process, this chapter will explore how Risk Management Programmes (RMP) were negotiated and constructed in the export meat sector. As I explained in Chapter Three, an effective way to understand the complex relationships within a network is to follow one of the actors. My decision to follow MAF in this case was based on a preliminary assessment that its role in transforming the discourse of hazard and risk in the New Zealand meat industry was crucial. Subsequent document analysis and interviews with meat industry stakeholders confirmed this view, while at the same time revealing how MAF's understanding of RMP was significantly influenced by its network associations.

As I explained in Chapter One New Zealand's position as a small, export-dependent meat producer leaves it in a weak negotiating position in relation to its two most valuable trading partners, the US and the EU. With respect to meat safety standards both government officials and private enterprise in these lucrative markets have been able to dictate terms to New Zealand producers. The meat industry in New Zealand point out that many of these standards exceeded those that EU or US domestic producers themselves were required to meet and they therefore characterise these standards as trade barriers with no basis in science.

MAF and the New Zealand meat industry were concerned that the lack of uniformity in meat safety standards posed a significant burden that compromised the ability of New Zealand producers to remain competitive. This concern was heightened by what appeared to MAF to be efforts by growing numbers of countries to use hygiene and safety issues to restrict free trade. Subsequent outbreaks of food-safety epidemics related to meat consumption in Britain, Europe, and the US, spurred MAF all the more to reconsider how New Zealand meat industry safety standards could be transformed both to improve consumer confidence and to strengthen New Zealand's competitive position. MAF's position, which it began to assert from the late 1980s, was that the solution lay in a uniform, consistent, internationally agreed-upon regime of food safety based on the science of risk management.

From the outset, the meat industry was concerned that MAF's solution of risk management was itself too costly for producers to implement and that they would not provide the trade outcomes that MAF predicted. This chapter outlines how MAF sought to enrol key actors in the export sector of the meat industry into a new network pressing for RMP. The focus here is to show the kind of arguments that MAF advanced to persuade these other actors that the only way forward was for them to join with MAF and to help reorganise the New Zealand meat safety standard. MAF's approach was complicated by the fact that no meat safety standard would be credible if it did not apply equally to all producers, yet domestic and export-orientated producers were motivated by different concerns. MAF's challenge was to find ways to demonstrate that risk management could meet both of their interests and goals. The essence of MAF's arguments was that the development of new meat safety standards based on risk management would provide a mechanism to give the New Zealand meat industry the means to strengthen its position vis-à-vis its main trading partners. A single meat safety standard across the industry would facilitate the ability for domestic producers to move into the export market, which many of them had been precluded from doing because of the expense involved in meeting various export standards (Inkster and Walker 2001). As well, MAF could give assurances to consumers both domestically and overseas that New Zealand meat safety standards were based on science.

4.2 Winning international support for risk management

MAF's attempts to enrol the meat industry in a risk management network began with an attempt to gain the support of prominent international organisations, such as Codex Alimentarius. Codex is a world body that establishes and promotes international standards for

food.¹⁵ It was MAF's belief that Codex provided just the kind of global forum in which risk management might have some reasonable hope of prevailing despite the objection of EU and US-based producers (Walker 2001). This judgement proved correct. Without this sort of international support any changes to hygiene rules and regulations in New Zealand would have had little value and the meat industry would have been unlikely to support an attempt to implement them.

From 1987, Andrew McKenzie, the director of the MAF Food Group Authority, saw it as a priority for MAF officials at Codex to fight for the 'international acceptance of scientifically justified and cost-effective food safety and meat hygiene programmes, based on agreed risk analysis principles and methodologies' (Calder and Tyson 1999:362). The means to do this was by committing resources needed to participate in and help lead several Codex committees working on the development of food hygiene standards (MAF Food Assurance Authority 2000). New Zealand currently hosts, for example, the Codex Committee on Meat Hygiene, 'which completely rewrote the international standards for trade in meat and game under New Zealand chairmanship' (MAF Food Assurance Authority 2000). Recent MAF publications indicate that the Ministry considers that it has been successful in accomplishing its main goal regarding hygiene standards. MAF explains that 'The codes of practice and guidelines produced through Codex are increasingly underpinned by a risk analysis approach campaigned for by New Zealand' (MAF Food Assurance Authority 2000).

MAF officials we spoke with explained that they continue to maintain a strong presence in Codex. This is considered vitally important for New Zealand as an export-trading nation because other countries, such as the EU and the US, use the Codex forum in an effort to preserve their own commercial advantage. This is commonly done by pressing for more costly hygiene regulations than competitors can afford (Inkster and Walker 2001). From MAF's perspective New Zealand's ongoing role in Codex is to see that international regulations adhere to scientifically verifiable standards and practices (Inkster and Walker 2001).

¹⁵ New Zealand participates in, and in many cases leads, the international standard setting organisations that establish the framework for trade in food products. New Zealand currently holds the Chair of the Codex Committee on Milk and Milk Products and the Chair of the interim Commission on Phytosanitary Measures. New Zealand also participates in the relevant Codex, APEC, United Nations Food and Agricultural Organisation (FAO) and OIE committees (MAF 2000a).

New Zealand trade officials have also played a leading role in advancing the adoption of risk management in the World Trade Organization's (WTO) Sanitary and Phytosanitary (SPS) Agreement, which was negotiated at the completion of the GATT Uruguay Round in 1994 (Calder and Tyson 1999:363). This multilateral trade agreement states that all restrictions on food imports by countries must be scientifically justified using risk analysis techniques such as HACCP (MAF 1997). The goal of the Agreement is, according to MAF (1997:1-2), to prevent countries using 'dubious import restrictions', such as the argument of health-protection, to protect their domestic industries from international competition ('green protectionism'). The Agreement explains that member nations 'have the right to protect life and health so long as measures taken are consistent with the SPS agreement' (MAF *et al* 1997:4). Given a choice of sanitary measures that will deliver the appropriate level of protection, WTO members must choose the one that has the least negative affect on trade (MAF *et al* 1997:6). Members are obliged then to ensure that their sanitary measures are based on an assessment of risk. Higher sanitary standards will only be accepted if they can be scientifically justified or if a risk analysis demonstrates the need.

New Zealand also fought hard to have the principle of 'equivalence' in food safety standards included in the SPS Agreement. With equivalence the focus is on outcomes rather than processes. Different measures to meet safety and hygiene standards used by an exporting country must be accepted by an importing country, if it can be 'objectively' shown, that they still achieve the importing country's required level of protection (MAF *et al* 1997:5). According to MAF (1997:9), the benefits of equivalence are that 'unjustified requirements' can be eliminated and costs reduced because standards will be internationalised. This eliminates expensive production runs that currently need to be conducted for individual markets. New Zealand would no longer have to replicate US or EU sanitary systems for exports because the New Zealand risk management standards programme would be recognised as delivering the same level of health protection (MAF *et al* 1997:5). MAF explains that 'judging the equivalence of different food control systems in different countries using a scientific and risk based process' is necessary to both 'ensure scientifically robust food standards and protect New Zealand's trade interests' (MAF Food Assurance Authority 2000).

Enrolling international actors such as Codex and the SPS Agreement to support the concept of risk management was critical for MAF in its efforts to implement RMP in New Zealand.

MAF recognised that it would be difficult for meat companies here to dispute such internationally recognised authority. Behind these authorities lies an extensive network of human and nonhuman actors, including international memberships, scientific bodies, corporate support, specialised committees, and publications that give guidance for how individual countries and companies should act.

4.3 Enrolling the New Zealand meat industry

When McKenzie became head of the Meat Division of MAF in 1987, his goals were two-fold: first, as explained above, to establish a uniform New Zealand approach to meat hygiene based on risk management at Codex and other international forums; and second, to convince the New Zealand meat industry that risk management was the way for the industry to achieve its stated aim of reducing regulatory costs (Calder and Tyson 1999:362; Pearson 2000). With the Codex Alimentarius Commission ‘aligned with New Zealand’s philosophy’ (Morel 1996:15) on risk management, together with the SPS Agreement, McKenzie and MAF had some powerful actors on side as they sought to accomplish his second goal. However, two major obstacles stood in the way; first, the relationship between the Meat Division of MAF and the meat industry had traditionally been adversarial, given MAF’s role as hygiene enforcer and government regulator; and second, the industry had only recently emerged from a long and costly process of reforming its hygiene standards. The industry had to be convinced that a new round of costly changes to hygiene standards would be to their benefit in the long run.

McKenzie recognised that to win the industry to MAF’s risk management strategy a new alliance had to be forged. Interest by the meat companies in risk management was created and sustained by MAF’s promise to involve representatives from the industry in setting standards, to devolve inspection services to industry to the greatest extent possible, and to move from a ‘defect checking’ approach of compliance to one of auditing systems (Calder and Tyson 1999:362). This process had already begun with the establishment in 1991 of the Meat Industry Hygiene Council, whose membership included the Meat Industry Association, the Meat Board, the Abattoirs Association and MAF Quality Management (Calder and Tyson 1999:362; Butler 2000). In 1993, the Council worked on developing industry standards and they produced a new edition of *Manual 5*, the ‘bible’ of industry slaughter and dressing procedures (Butler 2000). Previous versions had been criticised for prescribing procedures for

industry to follow under the direction of MAF. In contrast, *Manual 5* introduced the first standard based on collaboration with industry (Calder and Tyson 1999: 363).

In this context MAF officials began to radically change the way it promoted its role. MAF no longer argued, for instance, that government regulation was critical to ensuring food safety for consumers. MAF now saw its previous role as counter-productive in that it was a ‘command and control’ organisation that had blocked the meat industry from taking responsibility for running their own businesses (MAFc; Calder and Tyson 1999:362). According to McKenzie (1999:119) a “‘big brother’ prescriptive approach to standards’ was no longer valid. Similarly, Carole Inkster and Victor Walker, two MAF officials centrally involved in the development of the APA, expressed the view that the *Meat Act* 1981 (the predecessor to the APA), which involved MAF in both post and anti-mortem inspection of processing premises was excessively prescriptive. Under the *Meat Act*, Walker explains:

The manuals, the guts of what had to happen were 16 volumes of prescriptive detail, for example, on plant design, how high the ceilings had to be, ventilation, and so forth and since there was a licensing system MAF then had to approve the plans. So engineers were employed by MAF to approve all the plans. MAF was involved right from the beginning and were effectively managing the processing operation and even on the chain the MAF guy said ‘stop’ or ‘go’. The companies could step back from the day to day operations of their company and it was the MAF inspector that was there running the show.

Inkster argues that this set-up ‘*was like MAF standing in front of processors with a big STOP sign saying “we’ll tell you how to run your business”*’. Inkster said that MAF wanted to change this relationship to one ‘*where business is able to make the decisions about how they want to run their business, within a framework set by government*’.

The value of risk management, its proponents argue, is that it replaces this costly, bureaucratic ‘command and control’ system with one in which business takes responsibility for managing safety, thus ensuring cost-reductions, and greater flexibility and competitiveness for the industry (Gavan Herlihy 1998; *Animal Products Bill* 1998:1). These benefits to business can be achieved, according to MAF (2000a), because risk management systems focus on the documentation and auditing of safety procedures related to livestock, meat, and plants, rather than on the ‘hands-on’ visual inspection by government officials. While the government will still be responsible for setting standards and specifications according to what is considered to be an ‘appropriate level of risk’, the meat industry itself

will develop and implement their own RMP. So long as individual company RMP plans meet the government's standards, and are based on HACCP, then their content and their implementation are left to the discretion of the companies themselves (MAF 2000a).

MAF also sought to win the meat industry to risk management by proposing to them the concept of 'third-party contestability'. Their intention was to further reduce the cost of RMP audits by allowing private companies to competitively bid on contracts to provide the service (MAF 2000a). The Act states that once a registered RMP has been approved by the government Verification Authority then a meat company can then choose who they want to do their meat inspection (*Animal Products Act* 1999). Verification agents determine whether the meat plant is in compliance with the registered RMP and with any additional specifications for which overseas markets may demand government assurance. It is intended that the verification function will, in time, be undertaken by third parties independent of the meat company and of government. The government's objective is to create a framework that allows for the meat industry to purchase risk management compliance services from accredited private providers in a contestable market (*Animal Products Bill* 1998 No. 253—1:iv). Inkster and Walker explain that MAF was very genuine about creating a contestable market. However, to date, contestability only remains a possibility in the domestic market. In the export market third-party contestability is subject to approval by New Zealand's trading partners. The US and the EU, for example, continue to demand that only government employees carry out meat inspections.

4.4 Opportunities for a New Zealand meat safety standard

Inkster and Walker argue that the move towards a single meat standard for New Zealand based on risk assessment was driven by the inadequacies of the old *Meat Act* 1981. Concerns were expressed within both the government and the industry that regulations imposed by New Zealand's major trading partners took precedence making them the defacto New Zealand standards. For all intents and purposes, EU and US standards had made the *Meat Act* irrelevant (Inkster and Walker 2001). This resulted in higher compliance costs than would otherwise be necessary since each company was obliged to tailor its production standards to what seemed like the arbitrary demands of its customers. The aim of the APA then was to provide the meat industry with a uniform approach to food safety based on the science of risk management (Inkster and Walker 2001). Since risk management and the concept of equivalence had become part of the SPS Agreement and was advocated by Codex it was

assumed that New Zealand's trading partners would be obligated to accept such a standard. MAF proceeded to construct the RMP network on this basis, arguing that the industry in New Zealand would benefit from the creation of a 'seamless' regulatory regime across both the domestic and export sector (Inkster and Walker 2001). Under the *Meat Act* 1981, MAF was the government body responsible for ensuring that the export sector complied with all the various overseas requirements. However, the domestic meat sector was regulated more loosely. The domestic sector accounts for approximately 30 percent of the total slaughter of red meat and is provided by plants with export meat licenses, as well as, local abattoirs catering solely for the local markets (Miller 2001). But while formally subject to the regulations of the *Meat Act*, meat destined for the local market was generally considered to be of a lower quality and was rarely subject to the kind of rigorous inspections demanded by overseas customers (ANZFA 2000; Pork Industry Association 2000). This situation was further complicated by the fact that poultry, which is processed only for the domestic market, was never included under the *Meat Act* and instead came under the Ministry of Health (MoH) and the *Food Hygiene Regulations* of 1974.

Under the *Food Hygiene Regulations* any premises manufacturing, preparing, or selling food must be registered with their local Council. This covers poultry as well as secondary processors of meat, such as butchers and manufacturers of bacon and ham. Inspections of food premises are conducted by Council employed Environmental Health Officers (EHO). However, if businesses are manufacturing food that is not for retail sale on those premises, such as New Zealand's main poultry producer Tegal Foods, they are considered manufacturers. These manufacturers must then have the approval of the local Medical Officer of Health, who is employed by Crown Public Health (CPH), before the local Council can register them. Senior EHO Willis Heney explained that, since there are a large number of these premises, it is not practical for the Medical Officer of Health to physically inspect every individual premise. Instead, CPH rely on the EHO to inspect them; CPH only inspect a small number of plants on scheduled audits, if they have received a complaint, or if the EHO inspectors have some specific concerns. Although the EHO carries out most of the inspections only the Medical Officer of Health has the authority to close a premise for violation of the regulations.

The *Food Hygiene Regulations* were widely viewed by those in the meat industry as ineffective. Heney explained that his office was vastly under resourced, with only five

officers responsible for inspecting approximately 1400-1500 premises annually. Consequently, many companies are rarely inspected. Bob Diprose, the executive director of the Poultry Industry Association of New Zealand (PIANZ), argued that these old government regulations '*were a farce*' because it was rare for a company to receive even one annual inspection from health officials. Francis Clement, the Quality Manager for the Pork Industry Board agreed, explaining that MoH had no weight in terms of inspection because they simply did not have the personnel to inspect plants and enforce regulations. Historically, she explained, there was a different standard applied to domestic and export slaughterhouses; that meat for the domestic market, such as pork, was regarded as second class and not required to meet export standards. Dr Sally Hasell, the senior food advisor with the Australia New Zealand Food Authority (ANZFA), said that she believes there was an assumption in New Zealand that if MAF was doing a good job looking after exports, this would have a flow-on effect to the domestic food supply. However, she thinks that this is an exaggerated view of how effective this can be. Hasell says that when consumers see, for example, a label stating 'export quality' on a meat product it tells us that the standards for exports are superior to what consumers receive here.

MAF argues for the economic benefits of improved food safety standards in the domestic market. As Inkster and Walker explain improving domestic food safety is considered important because New Zealand's whole export market is premised on having a disease free domestic market. Inkster said that '*You only have to look at some of the recent food safety events overseas and see what that has done to both domestic sales and international trade to recognise how important it is to make sure that you get it right at home*' (Inkster and Walker 2001). The food safety concerns they were referring to included outbreaks of the potentially fatal foodborne pathogens salmonella, and *e-coli*, and the disease bovine spongiform encephalopathy (BSE), which is linked with the development of Creutzfeldt-Jakob disease, a deadly, brain wasting disease in humans (Macnaghten and Urry 1998). These diseases have been on the rise since the late 1980s and have predominated in developed countries, such as the US, Japan, Britain and some West European countries.

During the second reading in parliament of the *Animal Products Bill*, Minister of Agriculture Bill Sutton (1998:14633) expressed concerns about the 'alarming increase in food-borne disease in New Zealand'. He said (1998:14633) 'There is an increasing chance that we will have some scandalous event, perhaps along the lines of what occurred in Britain with eggs

that were infected with salmonella, or of what occurred in the United States with beef that was carrying *E. Coli*'. If this happened, he explained, it would have major economic consequences since New Zealand's reputation for producing safe food products would be badly affected (1998:14633). MAF official Tracey Grose reiterated this point when she told Dr Tanaka in an interview in 1999 that *'The whole clean and green quality [of New Zealand products] is very important and the work we try to do here is largely to keep that going, so that we are not having safety outbreaks associated with New Zealand products'*.

4.5 Reducing costs to business

A reorganisation of meat inspection services to save the industry money was introduced even before the Act was passed. In November 1998, the SOE, Asure New Zealand Ltd, was created to take over meat inspection from MAF Quality Management. Asure's 'mandate from the State (including MAF) was to cut costs, lift performance, and introduce efficient structures' (Martin 20/9/00). To accomplish this Asure's management eliminated overtime and shift allowance, reorganised its work force towards seasonal rather than full-time work, and reduced its staffing levels by about half to around 700 employees (Martin 20/9/00). Hamish Dobbie, a Business Development Manager with Asure, explained that in its first year of operation, his company was able to deliver *'a 22 percent reduction in the cost of front line meat inspection and a 37 percent reduction in the overhead costs associated with meat inspection'*. Dobbie said that these cutbacks provided the industry about 8 million dollars in savings.

To assist the major meat companies in reducing its costs associated with hygiene requirements, farmers are being asked to assume a greater share of RMP responsibility and MAF has worked to enrol farmers in its network. Previously, responsibility for meat safety and hygiene only began once the animal had entered the meat processing plants. RMP, however, encourages all sites of potential risk, from the production level right through to the sale point, to be identified so that they can be reduced or eliminated (*Animal Products Bill* 1998). With the introduction of RMP farmers will be expected to participate in programmes that require them to contribute to minimising levels of risk. A number of companies, such as PPCS Ltd and the Alliance Group Ltd, two of the largest meat companies in New Zealand, have already established accreditation programs with their farmers. PPCS began their programme three years ago, and they now have approximately 70 percent of their suppliers accredited (Pearson 2000). More than 90 percent of Alliance's stock come from accredited

farm clients (Kelvin Ashby 2000). Under accreditation programs, farmers have the responsibility to ensure that their stock arrive at the meat plants clean, dry, crutched, and disease-free. As well, they must have systems, audited by their meat company, that monitor all products administered to the animal, such as vaccinations. Full compliance is expected, even though farmers receive no direct financial incentive for doing so. Instead, as Kelvin Ashby, an executive with the Alliance Group explained, *'food safety starts with producers'* and *'farmers who do not participate in these programmes will no longer be in business'*. Grant Pearson, a Manager with PPCS agreed, saying *'Farmers who fail to comply will simply be weeded out'*.

4.6 The meat sector's response

MAF had sought to win the meat industry to the concept of RMP by arguing that it would make good business sense for them to support it. Towards this end, it utilised the authority of Codex and the SPS Agreement to legitimise the science on risk management and it took steps to devolve control over RMP to the meat industry themselves. Yet the response by the meat industry to MAF's initiatives was mixed. Dr Tanaka and I conducted interviews only after the APA had passed into law and during the initial stage of RMP implementation. The responses we recorded therefore reflect both the consensus that has been achieved on certain issues after ten years of discussion and the uncertainty and mistrust that remains.

Most of the individuals that we spoke with explained that MAF had sought to include all sectors of the industry in discussions concerning the development of APA and risk management. As Francis Clement, the quality manager with the NZ Pork Industry Board, explained, MAF invited industry representatives to participate in meetings, reviews, and discussion papers. Mark Cassidy, a manager with Tegal Foods, and David Hall, a manager with AFFCO meat company, explained that individual companies were able to make submissions on every aspect of the APA. However, what was also evident in several interviews was a sense that while MAF had consulted widely they largely ignored the industry's contributions. Cassidy explains: *'The majority of what MAF originally proposed remained the same. So we put a lot of effort in but the benefits were minimal.'* Another interviewee who did not want to be named in relation to this comment said: *'We had a lot of consultation with MAF, although MAF still went ahead and did exactly what they wanted to do.'*

There were differences within the meat industry between those who thought that the APA would benefit them and those who thought that it would not. According to the Meat Industry Association's (MIA) *Annual Report* (2000), and Angus Davidson, an executive with the Meat Industry Standards Council (MISC), both the MISC and MIA supported replacing the *Meat Act*, since they considered it out-moded. They believed that the APA was a step forward because it removed the prescriptive nature of standards. Dennis Butler and Kelvin Ashby, who are managers with the Alliance Group meat company¹⁶, explain that they were closely involved in the development of the APA. They believed that issues of market access and trade were the fundamental motivations for change. They felt that the EU and the US had the ability to dictate safety standards, even though some of their requirements did not appear to be scientifically sound. The APA was important, they argued, because it devolved responsibility for food safety to businesses, which were prepared to stand by the RMP measures that they implemented.

Differences remain over how to view the regulations. Graeme Harrison, the managing director of ANZCO meat company, believed that the APA was '*ideologically driven*' and that it reflected the '*economic fundamentalism*' that emerged in New Zealand from the mid-1980s, where the idea that government should have any role in business was rejected. He believed that the Act did not reflect market demands and his concern with the Act was that the government was seeking to pass responsibility for food safety issues from the government to industry when New Zealand's main trading partners were opposed to it. Harrison said that the EU, US and Japan were not prepared to allow the private sector to conduct meat inspection. In contrast, David Hall from AFFCO objected to the APA on the grounds that it did not go far enough in deregulating the meat industry. In his opinion, it is unnecessary for the government to play any role in regulating quality because customers demand that successful businesses will produce high quality. The APA simply adds unnecessary costs onto the meat industry. Bob Diprose said that the '*APA is just putting a lot of additional costs onto the industry. Unbelievable in the amount of documentation and verification and validation that we have to do and then the ongoing auditing costs, which we haven't had to do before.*'

¹⁶ Dennis Butler is also chairman of the MISC.

Support from the industry therefore was far from unanimous. MAF nevertheless, had brought on side some important players, such as the MIA, the MISC and at least one major meat company – the Alliance Group. Importantly, MAF had built a network of actors and resources —Codex, the SPS Agreement, the MISC, *Manuel 5*, and Asure NZ Ltd—which supported efforts to implement RMP in New Zealand. For RMP to be successful MAF did not require unanimous agreement. The network needed only to attain sufficient weight and authority to isolate contending voices and render them non-threatening.

4.7 Making risk management mandatory

With the support that MAF had built up over a decade, it now concentrated its efforts on enacting a law that would make RMP mandatory across the meat industry. The *Animal Products Act 1999* was the legislation intended to achieve this. The significance of this Act as a nonhuman actor lay in its ability to make social relations durable across time and space (Law 1992:387). Even if risk management practices are generally accepted in principle, they are only enforceable if there exists a body of rules that all participants understand and can be expected to abide by. Through nonhuman actors, MAF would be able to take a ‘hands off’ approach. There would be no need for hundreds of individual government officials to be located in the plants at once ratifying the network’s approach to standards. The text of the Act invalidates opposing practices which will occur financial penalties.

When the *Animal Products Bill* was discussed in parliament in December 1998 support for passing it came from all the political parties in office (National, Labour, New Zealand First, Act, and the Alliance). The Explanatory Note to the *Animal Products Bill* (No. 253-1:i) says that:

Traditional methods of managing hazards from food of animal origin are not very efficient or effective. If New Zealand is to safeguard public health and enable its industries to compete with countries that can apply more efficient, modern risk management systems, then the legal framework must be re-crafted.

In advocating passage of the *Animal Products Bill* at its second parliamentary reading (15 December 1998), then-Minister for Food, Fibre, Biosecurity and Border Control John Luxton (National) said that, the Bill was ‘premised on two fundamentals: the need to manage risks to consumers in New Zealand of animal products, and the need to facilitate export trade in animal products’ (Luxton 1998:14631). The aim of the Act was to ‘provide more flexibility

to producers, processors, and exports, and to allow them to manage the risks associated with products better than they are able to do under the current law' (Luxton 1998:14631). The *Animal Products Bill* (1998:1) states that the previously existing regulatory environment condemned the meat industry to 'historic methods and unnecessarily high costs'. Risk management, according to Luxton, would assist 'New Zealand's competitiveness, and safeguard international market access' (1998:14631). With reduced costs, fewer government 'constraints' and increased 'flexibility,' it was hoped the industry could compete more efficiently internationally (*Animal Products Bill* 1998:1; Luxton 1998:14631).

4.8 Conclusion

The creation and implementation of RMP as a standard for meat safety was not the product of 'science' understood as some privileged method of analysis. Rather it was the negotiated outcome of a process of network building led by MAF that enrolled both human and nonhuman actors in a network to support its claims. These actors included Codex, the MIHC, the MIA, government ministers, and sections of the meat industry, as well as the SPS Agreement, *Manual 5*, and finally the APA itself¹⁷. On their own, MAF recognised that it had neither the authority nor the resources to transform New Zealand meat safety standards. Only when they could mobilise all of the texts, skills, manuals, expertise, status, money, and links to other actors and networks that stood behind them, that MAF was able to turn risk management into something that could now be considered a legitimate 'science'.

Potential allies cannot be drawn into a network unless they are convinced that their own interests will be better served by doing so. Accordingly, this chapter has detailed some of the arguments that MAF used to persuade various meat industry stakeholders of the value of risk management as both scientifically verifiable and economically sound. Risk management, MAF stresses would give New Zealand a standard that would be acceptable internationally for purposes of international trade without imposing undue financial burden. This would place New Zealand companies on a more equal footing with their international rivals. Since risk management was concerned now with outcomes not processes then companies could exercise greater judgement and flexibility in applying the new standard. While it is

¹⁷ I have to point out that the process of building networks is complex and that the number of actors involved is far greater than what I have presented here. Unfortunately, due to time and space considerations I have only been able to highlight some of the most important examples in this chapter.

reasonable to conclude that MAF expects RMP to minimise the incidence of meat related outbreaks of disease and food poisoning.

This chapter then has focused on the network building efforts and the arguments and methods that MAF put forward to win the various actors within the widely divergent meat industry to support RMP. In other words, how MAF has attempted to negotiate and construct RMP. To illustrate this, most of the information and arguments presented here were drawn from MAF data, including industry journals, the Bill and the Act themselves, and our interviews with officials and the meat industry. In the next chapter, which relies predominantly on the interviews that we conducted with actors both from within the meat industry and with links to the meat industry, I will illustrate how MAF's understanding of RMP and the New Zealand standard that is laid out in this chapter gets disrupted by the various actors within the network.

Chapter Five

Contesting the Network

Public perceptions about food safety can be clouded by unreasoned fear and misinformation. Consumers of New Zealand food products, however, can be assured that what they eat meets or exceeds rigorously developed international standards, based on good science.

Andrew McKenzie, Director, MAF Food Assurance Authority, 2000

5.1 Introduction

In the previous chapter, I followed the Ministry of Agriculture and Forestry (MAF) in its efforts to shift the discourse of food safety from hazard inspection to risk management. MAF was the leading proponent of RMP, arguing in global forums that this would facilitate free trade to the benefit of all nations, while at the same time arguing with the expert section of the New Zealand meat industry that it would strengthen this country's ability to remain profitable and competitive in the world market place. MAF believes that having secured the backing of the Codex Alimentarius Commission and the SPS Agreement, that New Zealand's overseas trade partners could no longer impose what seemed to be arbitrary inspection and certification standards. So long as the New Zealand meat industry could demonstrate a rigorous application of RMP, generating safe food outcomes, any hygiene procedures used to achieve this result would be universally recognised as 'equivalent'. In the long run, this would substantially reduce compliance costs, which MAF hoped would encourage more New Zealand producers to enter the export market. The meat industry as a whole then was expected to adhere to a common RMP standard in order to preserve the integrity of the New Zealand 'brand' as a safe, high-quality source.

Having demonstrated MAF's efforts to construct a network of actors legitimising RMP, I turn in this chapter to an examination of how those efforts were contested by actors within the New Zealand meat industry. The substance of this chapter is based on the interviews that Dr Tanaka and I conducted with industry stakeholders. In these interviews we asked participants whether their company or organisation had been involved in discussions with MAF leading up to the passage of the *Animal Products Act* (APA); the extent to which their operations had changed under the APA; what their views were on RMP-based meat safety standards; and

what particular challenges, if any, they were confronting as they attempted to implement RMP. What became apparent through the interview process is that there is no unified understanding of the key concepts and practices on which RMP is based. Hazard identification, risk assessment, and risk management, remain points of controversy that are open to varied interpretations. Practical implementation of these concepts is by-and-large the product of negotiation, which places a premium on economic and political resources that exist within the meat industry and the relationships between actors.

The first section of this chapter examines the export meat sector with a focus on commercial trade relationships with the US and the EU partners and the role of nonhuman actors, such as foodborne pathogens, as principle actors that shape what decisions get made in relation to meat safety practices. The second section of this chapter examines the domestic meat sector, focusing on how differential access to research funding, and technical expertise contributes to a varied understanding of food safety and RMP.

5.2 Key actors in the export network: The role of the EU and the US

One of the most important goals that MAF believed could be achieved through the introduction of RMP was the acceptance of New Zealand meat safety standards as ‘equivalent’ to those of its overseas trading partners. MAF argued that New Zealand exporters would not have to replicate US or EU hygiene practices in every detail because RMP, which was ‘based on scientific principles rather than tradition and superstition’ (McKenzie 1999:119), ensured the same level of health protection (MAF *et al* 1997:5). MAF, with the support of Codex and the SPS Agreement, understood equivalence in meat safety to mean ‘equality of outcomes’. While companies might have different testing inspection regimes in place, RMP would standardise the way that these regimes were assessed, in terms of costs and benefits to the public.

Acceptance of the concept of equivalency was seen as essential in improving New Zealand’s competitive position. According to John Miller of the Meat Industry Association (MIA), New Zealand producers have had to meet separate sets of regulations, not only from the US and the EU but also from Japan, Korea, Russia, and the Middle East. Only a small fraction of New Zealand’s exports are currently sold to countries that accept existing New Zealand standards and practices. As well, companies must meet the particular food safety requirements of their individual customers, such as Burger King in the US, or the

supermarket chain, Sainsburys in Britain. Equivalency was therefore viewed by MAF and the meat industry as a key means to reduce costs to New Zealand companies by allowing individual companies to establish safety practices that best suited *them* but that still met the New Zealand standard. The science of risk management was seen as the mechanism to rebalance the unequal relationship that the New Zealand meat companies believed existed between themselves and those international actors with whom they traded.

MAF's optimism about the effect equivalence would have was not widely shared by meat industry leaders however. In fact, when Dr Tanaka and I spoke with representatives of the export meat sector there was a near-unanimous conviction that New Zealand's meat safety standards would *not* be generally accepted as equivalent for purposes of trade. Instead, most of the company executives we interviewed believed that international food safety standards would become *more* detailed and stringent not less. Kelvin Ashby and Dennis Butler, two senior executives from the Alliance Group, argued that there was simply no common agreement on what 'equivalent' standards would look like. While New Zealand might prefer to interpret this in terms of outcomes, overseas customers were reluctant to accept any notion of equivalence that was not linked to processes. Seeing that these customers could readily turn to other suppliers willing to meet these demands, New Zealand's opinion regarding equivalence was almost beside the point.

What meat companies have concluded is that there is no universal understanding of what constitutes risk assessment and risk management. MAF's view that these procedures are scientifically verifiable assumes a common framework for identifying and measuring risk when in fact this is highly contested. Ashby and Butler illustrated this point with an example from recent negotiations between the Alliance Group and one of its customers in Britain. A British Retail Consortium (BRC) standard was recently created to regulate food safety for the main British supermarket chains. There are five auditing agencies in the UK who can audit to the BRC Standard and the one that the Alliance Group deals with is the European Food Safety Inspection Services (EFSIS). According to Ashby, the EFSIS standard is comprised of 36 sections and each of these sections has a statement of intent; EFSIS requires that these statements be captured in the Alliance's quality manual. Ashby said that they were struggling to work out how to incorporate EFSIS requirements, along with those of other individual customers, and the Overseas Market Access Requirements (OMARs) of each country, into one common programme.

The EFSIS audit highlighted to Ashby and Butler that the two organisations have very different perspectives on what constituted risk assessment. Ashby argued that when his company conducts a risk assessment they focus on identifying and controlling microbiological hazards, since they believe that these pose the greatest health risks. The EFSIS, however, focuses on identifying and implementing control mechanisms for physical hazards, such as glass, metal, or hard plastic, which may enter the product. The EFSIS auditor explained to them that only one critical control point, metal detection, would be required in the Alliance's HACCP plans. Ashby said that the Alliance had previously reviewed their customer complaint files to assess the likelihood of metal substances in their meat products and they determined that the risk was minimal and that metal detection was therefore unnecessary.

Ashby and Butler assert that their understanding of risk assessment and risk management is based on hard scientific evidence whereas the approach of the EFSIS is based on a fear of litigation. British companies focus on physical hazards, they claim, because physical objects are easily traceable to the company who supplied the products and so are more apt to land companies in court. The Alliance executives felt that such commercially-driven standards were more demanding than those set by government bodies, such as the USDA, which tended to rely more on scientific evidence. Undoubtedly, EFSIS would challenge the Alliance Group's claim to the scientific moral high ground. Perhaps it would be no less reasonable for the EFSIS to claim that the Alliance's focus on microbiological hazards, and not physical hazards, is due to commercial interests. Perhaps their focus on microbiological hazards is a matter of efficiency and cost effectiveness since a programme for managing microbiological risks is already a requirement for exporting to the EU and US, while the investment required for physical hazard detection procedures is considerable.

5.3 The role of foodborne pathogens as actors

The Alliance executives, and John Miller and Angus Davidson from the MIA, argue that New Zealand meat companies are being asked to meet standards that have little basis in scientific evidence. Miller and Davidson explain, for instance, that companies here must test for the potentially deadly bacteria, *e-coli*, even though in their view New Zealand does not have high enough levels of these bacteria to actually warrant testing. In New Zealand one positive sample of *e-coli* is returned for every 50,000 samples, whereas in the US, one positive sample is returned for every 1,000 samples. In addition, they claim, New Zealand has a sophisticated,

national microbiological database that statistically supports their assertion (Davidson & Miller 2001). Yet Ashby and Butler explain that one of their major US clients, Burger King, require that all meat produced for them is sampled for *e-coli* by an independent third-party testing agency. They also said that the USDA was considering requiring New Zealand companies to steam pasteurise whole carcasses as a market access requirement.

Such requirements have arisen in response to the dramatic increase over the past ten years of new variants of deadly foodborne diseases and pathogens within New Zealand's major markets of the US, Britain and Europe. These outbreaks have included, for example, BSE, *e-coli*, Belgian dioxide, and salmonella enteritidis. Meat company executives and managers we interviewed explain that these outbreaks, and the resultant increase in food safety concerns by consumers, has led both government agencies and private buyers to become more demanding in their meat safety requirements (Ashby and Butler 2000; Harrison 2001). In 1996, for example, in the wake of successive *e-coli* outbreaks in the US, the US passed the *Pathogen Reduction Act*, which legislated for the introduction of HACCP (Juska *et al* 2000).

The problem, as far as Ashby and Butler are concerned, is that these outbreaks have encouraged their trading partners and customers to '*react in a traditional, and less scientific way*'. They believe that many of the demands, such as end-product testing for *e-coli*, have nothing to do with scientific evidence and are instead largely influenced by the irrational concerns of American consumers. The result is that the 'science' of risk management has become more clearly a product of negotiation. With respect to the practice of swabbing bobby calves for bacteria, for example, the USDA initially demanded that a 100cm² area be tested, while the Alliance Group explained that New Zealand only requires a 10cm² area for their trials. MAF eventually reached a compromise with the USDA and now requires swabs of 25 cm². A similar compromise was reached on *e-coli* after the US introduced its HACCP standard and required New Zealand to do the same (Nortje 2001). Nonhuman actors have therefore played an important role in influencing meat safety standards, defying in several

cases the accepted knowledge of what is safe to eat.¹⁸ Whether consumers have responded rationally, or not, they have carried greater weight than New Zealand's claims that their processes and food safety standards are based on science.

In the New Zealand domestic meat sector, on the other hand, the perceived absence of potentially deadly pathogens and diseases in meat has led to a sense of complacency about food safety standards. Participants in our research acknowledged a prevailing 'she'll be right' attitude about meat safety. For Michael Gilchrist, the manager of Malvern Abattoir Ltd, hygiene conditions have improved since the days when you '*only washed your hands if they had blood on them*', but attitudes to safety issues have now '*gone overboard...driven by the hygiene people*'. He thinks the problem is that the people who make decisions about safety standards are '*technical people*' rather than '*practical, processing people*'. The Meat Hygiene Council, for example, is comprised of MAF and meat industry representatives but few people 'from the coal-face' who understand the day-in-day-out difficulties of implementation. Gilchrist reiterated a number of times that while there are undoubtedly certain shortcomings in hygiene this has to be put into perspective as '*no-one has died yet*'. He said New Zealand's record in this regard was outstanding compared with a country like the US where people had died from meat infected by pathogens, such as listeria or *e-coli*.

Other individuals we spoke with made it clear that they believed there would be little real change in food safety practices in New Zealand short of an epidemic breaking out. In the opinion of Senior Environmental Health Officer Willis Heney there is a laxness about food safety in New Zealand due precisely to the fact that to date nothing has evidenced itself '*so dangerous that it kills people*' or cause them '*to get violently ill*'. If that were not the case, '*the whole business of food safety would be more tightly controlled*'. Heney went on to explain that '*A lot of what we do currently is about luck... We don't have e-coli, and listeria is rare, and because our industry is small the impact of something going wrong is unlikely to affect many people*'. Rosemary Whyte, a microbiology consultant with the ESR, also believed

¹⁸ Issues of trust are an important aspect of this debate. Attempts to cover-up or minimise the effects of foodborne crisis have lead to a crisis of consumer confidence in both scientific and government authorities. In Europe, for example, government ministers were forced to resign when it was found that they tried to keep secret that animal feed poisoned with dioxins had been used in the production of eggs, meat, and dairy products in the 1990s (Almas 1999). Regarding the BSE controversy in Britain during the late 1980s and 1990s public concern over the risk of beef infected with BSE causing CJD in humans was repeatedly dismissed by the British government, meat industry, and scientists for over a decade because there was '*no scientific grounds for such concern*' (Macnaghten and Urry 1998:258).

that it would take a major food safety incident to focus attention on the need for more adequate preventative food safety measures. She cited the example of the UK where following a deadly *e-coli* outbreak originating from a butcher in Scotland, the UK government mandated registration of all butchers. *'It was very strict'*, Whyte said. *'In order to register you had to have in place a food safety plan based on HACCP principles, and if you could not do that you were closed down'*. The role of nonhuman actors, such as *e-coli*, therefore, has had a significant influence on how different human actors within the export and domestic meat networks have responded or not to implementing meat safety standards or food safety regimes, such as risk management and HACCP.

5.4 What is science?

One of the most controversial issues within the export sector centres on the role of veterinarian science. Some company representatives believed that the shift to risk management would result in the phasing out of veterinarian inspections. However, the fact that this has not occurred reflects a further process of negotiations within the food safety network. Once again, New Zealand has been required to conform to the position of their trading partners on this issue. The EU, for example, insists that a veterinarian be in processing plants at all times. They require that veterinarians themselves conduct the anti-mortem inspections and that they oversee all post-mortem inspections (Davidson 2001). The USDA, on the other hand, insists that, while veterinarians do not have to be onsite permanently, one must be 'available' at all times during the production process (Davidson 2001).

Several meat company representatives that we interviewed argued that this reliance on veterinarians was more a matter of tradition than science. Graeme Harrison, the Managing Director of ANZCO Foods, argued that veterinarian science is not '*pure science*' because it relies on '*judgmental factors*'. As such, he felt that the continued role of veterinarians obstructed risk management reform, since if companies themselves, were to bear the responsibility for food safety outcomes then they needed to do so on the basis of methods '*where the science is absolutely clear*'. Harrison argued that '*if you get down to the science in the Animal Products Act you don't need veterinarians, you need food technologists*'. Meat hygiene professionals in the EU are for the most part veterinarians, but ANZCO use food technologists to conduct their safety audits. '*In the end*', he said, '*it's about bug-counts and residues and you test for that. It's all science not interpretation*'.

Arguing that veterinarian science is subjective and that veterinarians should be replaced with food technologists may be a scientific issue but it is also a political and economic issue for the industry. I would argue that we could link debates surrounding veterinarian science to a common view by meat company officials that veterinarians are in a position to hold the meat industry 'to ransom'. In February 2001, for example, government veterinarians went on strike. According to the *Christchurch Press* (22/2/2001:9a) in its first week this strike saw '20 per cent of the South Island's processing capacity and 80 per cent of the North Island's processing capacity grind to a halt'. Naturally, the meat industry resent this 'practical monopoly' (*Press* 22/2/2001:9b), whereby the actions of the veterinarians are capable of 'crippling meat exports' (*Press* 22/2/2001:9b). This resentment is also directed at their trading partners who have the political and economic power to insist that veterinarians be present to inspect livestock, to oversee the work of Asure's meat inspectors, and certify meat for export.

Scientists at ESR, on the other hand, argued that even with the introduction of risk management systems veterinarians still have a specific and relevant role to play regarding food safety standards. Dr Gerhard Nortje said that he thought that veterinarians would always be necessary because animals will always have diseases, as well as contaminated areas (such as cysts or abscesses), that have to be identified during pre-mortem and post-mortem inspection. This very specific role, he said, is the job of veterinarians not microbiologists. In terms of HACCP, Nortje explained, there are different CCP's on the slaughter line and the veterinarian is fully in charge of one of them. That CCP is to check whether any carcass is diseased or contaminated and to decide whether that product should then be accepted or rejected. Andrew Hudson, also a scientist with the ESR, argued that it is important that the animals you kill are healthy and that it requires very specialised training to see in a pre-mortem inspection whether an animal is sick or not. *'If you had an animal that was really sick and had septicaemia with salmonella'*, Hudson explained, *'what you did to the animal afterwards would not improve it because the animal would have systemic pathogenic bacteria and so you would be selling really suspect meat'*.

5.5 Status quo in the export meat sector

The adoption of RMP and the establishment of a New Zealand standard have done little to alter the relationship between meat companies here and their overseas customers and trading partners. While MAF proposed that food safety standards based on a scientific premise would

lead to the elimination of ‘unnecessary’ requirements this is not the case. The fact remains that standards are contested and what standards are adopted is as much about negotiations and power relations as they are about bacteria counts or the ability to identify contaminated meat. The concept of equivalence of standards comes down to an issue, not of science, but of power relationships. Angus Davidson from the MIA explained that despite the fact that equivalence is part of the SPS Agreement, and therefore a WTO requirement, the US is still the biggest, most powerful country in the world. He said that even if international agreements support the New Zealand position the meat sector here cannot afford to have its industry shut down for a couple of years while it went through a WTO hearing but that the Americans could afford to do that. Maxine Yule, from Federated Farmers, likewise explained that even if other countries’ standards were higher than here, if they did not contravene WTO requirements then New Zealand would have little choice but to meet them because of the country’s dependence on exports.

5.6 Interpreting RMP

One of the major issues that emerged from the interviews was a precise definition of what constituted a viable food safety risk management programme. Hamish Dobbie, a manager with Asure NZ Ltd, explained that the RMP are ‘*incredibly loose and hard to understand*’ and that the meat industry are struggling to come to terms with what they have to do to create risk management plans. Grant Pearson, the processing manager from PPCS, described RMP as ‘*a vaguely defined set of documentation*’. He said that his company found this approach confusing, and they were still unsure exactly what the RMP was supposed to consist of. Comments by David Hall at AFFCO were similar. He explained that one of the major problems that his company was having with implementing RMP was that they did not actually understand what they should be doing. He said they felt as if they were ‘*almost setting the rules ourselves and we don’t know if that is right or not or what’s intended, so we head in a particular direction and then we find that is not what is intended so we have to change direction slightly*’.

One of the consequences of this inconsistency is that RMP looks far from being the kind of uniform standard that MAF originally maintained it would be. This calls into question the ‘scientific’ basis of MAF’s reforms. Ashby outlined how every step of the evaluation process required a good measure of negotiation to convince the evaluators and auditors that the processes the Alliance company had put in place would meet the New Zealand standard. He

explained that once a company had developed their RMP, the programme has to be submitted to a government evaluator who would then do an onsite inspection. Once this inspection was completed, the programme's documentation was sent to MAF Food in Wellington who review it and once they have approved it the RMP becomes registered. From this point on the veterinarians are responsible for verifying a company's practices on a day-to-day basis, both in terms of reviewing their records and how their programme is actually being implemented. The Alliance's concern, Ashby explained, was in deciding how to capture all the information that they need to in order to satisfy all of the requirements and *'then **convincing** an evaluator that this is a satisfactory way of doing that. The challenge after that is equally **convincing** a compliance group reviewer who comes along to look at it after the evaluator said its ok, that it's still ok'* (my emphasis).

Gilchrist also had concerns with the lack of consistency in interpreting the content and standards of a RMP. Gilchrist argued that the problem is that there is not a consistent approach from all the different MAF sectors, making it difficult for the company to know what standards were acceptable. A MAF veterinarian, for example, he explained, could say that you have met all the criteria for meeting the food safety standard but then MAF Verification Authority (VA) can turn around and dispute that. Gilchrist explained how MAF VA come and audit his abattoir once a month. The VA person *'comes here and he spends very little time up on the plant reviewing the processes but he spends a lot of time in the office going over the papers'*. Theoretically it is about science, but practically it is not, Gilchrist says, because in the end it *'all comes down to human behaviour and interpretation'* not science. The meat companies' experiences of implementing RMP, therefore, are very different from MAF's idealised view of it as an objective scientific process. As these interviews illustrate what consists of a RMP and how that plan should be implemented, monitored, and policed is a matter of interpretation. This interpretation leads to inconsistency in what different people consider an adequate programme to meet the New Zealand standard. What a RMP looks like and how the New Zealand meat safety standard is being met, therefore, varies within the network. Its outcome depends on what actors have been involved in the process, what resources and skills that person has to back up his or her claims, and finally, the results of negotiations between those actors.

5.7 Comparing the domestic and export meat industry networks

Risk management of food safety focuses on meeting *outcomes* rather than *practices*, the assumption being that many different practices are equally capable of delivering the desired outcome. As my research indicates, this assumption is contested. However, even accepting for the sake of argument that this is a valid approach the difficulty remains that there may be a significant difference in how outcomes are measured. In the case of the export and domestic sectors, the difference is largely attributable to the differential access to expert knowledge and the resources to apply it. In the export meat plants, for example, companies such as the Alliance Group, ANZCO, and PPCS maintain their own private laboratories, employing food technologists, chemists and microbiologists who conduct testing (Ashby & Butler 2001, Harrison 2001, Pearson 2000). In addition, these companies have sufficient financial resources to contract outside expertise with organisations such as Agresearch¹⁹ (Ashby & Butler 2001).

However, in the domestic sector such resources are limited. Malvern Abattoir, for example, has the mandatory Asure meat inspectors permanently on site, but there are no food technologists or scientists (Gilchrist 2001). Gilchrist explained that the Malvern Abattoir is currently in the process of upgrading its operations to qualify for registration as an export plant, but the investment required is enormous. As an export plant, Malvern Abattoir will be subject to stringent USDA inspection procedures, which Gilchrist describes as ‘*very microbiological – swabbing and so forth – they want the product clean*’. Gilchrist explained to me that since swabbing checks for levels of microbiological contamination have not been mandatory for domestic trade, the company has stored no quantitative data that would enable it to determine whether such tests make any difference in producing safe meat, or in fact reduces the risk of passing on foodborne pathogens. A risk management programme at Malvern Abattoir will therefore, initially, at least, be based on a significant amount of guesswork.

Given such problems, RMP is likely for some time to authorise multiple standards for processing meat. It will also authorise multiple standards for the quality of the stock accepted for slaughter which has the potential to affect the quality of the end product. The export

¹⁹ Agresearch is a New Zealand Crown Research Institute that conducts research and development in agriculture and biotechnology.

sector's overseas trade partners have tightly regulated the quality of the stock, where EU or US auditors frequently audit both farms and processing plants (Yule 2001). Francis Clement, the quality manager at the New Zealand Pork Industry Board, explains that since New Zealand has a reputation for delivering meat with high levels of chemical residues than standard regulations, vendor declaration forms are being gradually introduced. The forms record what treatments animals have had, such as hormone-growth promotants, and what diseases they have contracted, so that the person buying them can then treat them accordingly (Yule 2001). As well, any specific company requirements are recorded on them. A farmer is required to complete a form for each batch of animals sent to the meat works. These forms are treated as an OMAR, meaning that while they are not compulsory in a legal sense they are for all intents and purposes in a commercial sense (Yule 2001). Again, however, the only oversight provided is that of the individual processing companies and there is some difference in the approach of the export and domestic sectors.

Export companies also have supplementary declaration forms with their stock suppliers. The Alliance, for example, has a Quality Assurance programme that covers approximately 90 percent of their farmers. Under this programme, stock must be delivered to the plant clean, dry, crutched and in good condition. The company says that these criteria are designed to improve the safety of the meat. If the sheep are clean and crutched, for example, the risk of the meat becoming infected with dangerous pathogens through touching the contaminated skin and wool is reduced. Company agents train the farmers and then contracts Asure NZ Ltd to independently audit the farm programmes. David Hall from AFFCO explained that their customers require AFFCO to monitor product quality from the farm through to the retail sale at the other end.

Domestic processors are less rigorous. When I asked Gilchrist about the quality of the stock that they process at Malvern Abattoir, he acknowledged that domestic standards were not as stringent as export standards. Overall, he said, producers like Malvern Meats could cater to local demand for cheaper prices, simply because *'although there's not a great deal of difference, the stock is inferior'* [to that destined for export]. However, this would change with RMP. Gilchrist explained that once Malvern Abattoir had upgraded the plant they would then be *'the supplier of export quality sheep and beef meats'*. Malvern Abattoir's key concern was whether they would be able to meet the new stock quality standard. The abattoir does not operate farmer accreditation programmes, although they have begun to introduce vendor

declaration forms. Gilchrist explained that while some farmers are very proud of their stock, others are not, and the ones that are not will ‘*send in crap*’ to his plant. He said that they sometimes receive stock ‘*that should never have even got on the truck*’.²⁰ Gilchrist says that, although it’s ‘*a big learning curve*’ for farmers, he hopes the introduction of these forms will improve the quality of their stock.

5.8 Disparity in the domestic sector

The failure of MAF to harmonise the domestic and export meat safety standards is a significant problem. While all primary processors are now required to operate under the APA, secondary processors, service providers and retailers fall under the separate—and, in the opinion of several spokespeople interviewed, unequal—*Food Act*, which is the responsibility of the Ministry of Health (MoH). Under the *Food Act* secondary processors have several options available to them.²¹ They may, for instance, choose to operate within the framework of the APA and implement a risk management programme. At their discretion they can put in place a HACCP-based Food Safety Plan (FSP) or simply abide by the existing *Food Hygiene Regulations* of 1974. The result has been that most businesses have chosen to remain with the status quo (Heney 2001; Whitaker 2001).

The NZ Retail Meat & Allied Trades Federation (RMATF), which represents small retail meat businesses, agrees that standards for their members have to improve. Barry Whitaker from the Federation explained that his organisation is encouraging its members to adopt a Food Safety Plan, but while approximately 60 of 160 RMATF butchers have purchased the Federation’s generic food safety templates, this is just the first step. Most of their members are not operating safety plans, and many have no idea what the APA is. Describing the domestic food safety regime as ‘*hopeless*,’ Whitaker believes that in the absence of legal sanctions in place the widespread adoption of FSP by small retailers will never occur.

²⁰ Under the Animal Welfare Act truck drivers are not supposed to accept an animal that is impaired, lame, or has not got a veterinarian certificate.

²¹ In the first draft of the proposed *Food Act* the proposal was that the new law would require that all businesses who deal with food would be required to implement HACCP-based Food Safety Plans (FSP) within three years. However, this clause was removed when the draft became a Bill (Heney 2001). Heney believes that the clause was removed because the MoH did not have the resources to enforce the implementation of FSP.

The failure of MAF to integrate secondary processors under APA legislation continues to pose serious food safety risks for domestic consumers. Many of the people we interviewed were concerned by what they saw as a continuing disparity in hygiene standards within the domestic sector. As Gilchrist bluntly put it, *'some butcher shops are clean and hygienic while others are not'*. Clement explained that the major issue for the pork industry is the production of ham, which has a very high risk of listeria, owing to an expected long shelf life. She argued that the small retailers that produce bacon and ham are a risk because *'they are not monitored and they should be'*. A recent company recall of several million dollars worth of ham products suggests this risk is not entirely under control. Dr Sally Hasell, a scientist with ANZFA, believes that the focus of health standards now needed to be on the small players, such as butchers, because the big meat players *'have their act together'*. David Russell, the director of the Consumers Institute, echoed these views. Russell believes that the export meat companies are more conscious about safety procedures because they are aware of the severe commercial consequences they face if their meat is rejected. On the other hand, local abattoirs tend to take the view that they should be allowed to *'do it our own way'*. Hasell's concern was that these small players are not sufficiently constrained by existing legislation, which was adopted with the understanding that small producers would have only a minimal impact on public health. Hasell argued that this belief is now outmoded. In Britain, for example, it was a local butcher distributing to the local community who was responsible for one of the most devastating and deadly outbreaks of *e-coli*, she said.

Gilchrist argues that the meat safety measures that Malvern Abattoir is required to abide by can be undermined by businesses that subsequently handle the Abattoir's product but who do not operate under the APA. As an example, he pointed to the hygiene quality of trucks that pick up carcasses from his plant and deliver them to smallgoods plants or butchers shops. Gilchrist said that these trucks are not monitored for hygiene conditions and those that do not undergo a rigorous sterilising process undo a lot of the good work that his plant has done. *'They are disgusting'*, he said. Gilchrist also claims that while the trucks have refrigeration, cost-conscious drivers often do not turn it on. The trucks make so many stops at butcher shops and retailers, and every time they open their doors, all the cold air that they have generated is lost, so the refrigerated chain is broken.

Concerns raised by individuals we interviewed regarding food safety in the domestic sector are supported by quantitative data. Reported rates of food poisoning have been steadily

increasing since 1980 but soared in 1998, illustrating the high levels of foodborne diseases in New Zealand. This country has the highest reported rates of campylobacteriosis in the developed world, reaching a level of 320 per 100,000 people in 1998. There were 11,503 reported cases of campylobacter in 1998 – an astonishing 30 percent increase over 1997 (Consumer 1999:8). Salmonella poisoning is even worse; up 77 percent in the same time to 2069 cases for 1998 (Consumer 1999:6). Dr Hay, the ESR Chief Executive, says that the high numbers of people notified with these diseases is of real concern. ‘We are seeing a level of illness which you would not expect to see in the developed world and we need to know why this is happening in New Zealand,’ he said (ESR 2000). The ESR also reports that cases of *e-coli* infections have ‘risen markedly since 1997’ with 48 cases reported in 1998. Scientists with the ESR explain that ‘it is probably only a matter of time before there is a large outbreak in New Zealand. The sources and modes of transmission are not known in New Zealand and require further research before prevention and control strategies can be implemented’ (Orchard *et al* 2000). They go on to argue that ‘prevention and control of gastrointestinal disease requires a more integrated approach to food safety than the sector-based approaches taken at present in New Zealand. An understanding of the ecology of pathogens is essential to reversing New Zealand’s poor record with regard to preventing enteric disease...’ (Orchard *et al* 2000).

The existing disparity between food safety standards in the domestic and export meat sectors is exacerbated by the fact that successive governments have prioritised research funding for export operators. According to Dr Hasell at ANZFA, while New Zealand ‘*has this massive problem,*’ there is very little funding for research into domestic issues of foodborne pathogens. Hasell explained that ANZFA faced difficulties in trying to get a commitment from the government for more campylobacter research in poultry processes. ‘*The problem,*’ she explained, ‘*was that ANZFA could not find any mechanism to compel the government to fund the research needed. We had to compete against all the other funding requirements,*’ she said, ‘*and the problem is that the government and the Foundation for Research Science and Technology (FRST) have a commitment to funding exports and New Zealand does not export poultry. Using overseas research is of limited benefit,*’ she explained, ‘*because other countries do not have the same problems as New Zealand and therefore do not put the same resources into research*’. Hasell believes that there is resistance to conducting research because to do so would call into question the image that New Zealand is a healthy source of

food products. So, she says, *'The cost to the community is enormous, and yet we still have the government saying our food is clean and green'*.

Hasell argues that the lack of research into foodborne pathogens, such as campylobacter and salmonella, has significant consequences for how effective HACCP-based RMP can be in reducing the likelihood of food-poisoning outbreaks. According to Hasell, RMP is a good thing *'provided that you know whether the things that you are doing will manage the risk or hazard'*. She thinks that while a nominal food safety regime of general hygiene principles will address some issues, a HACCP programme *'is only as good as your knowledge of hazard control'*. You need to understand how a particular hazard is occurring, and you then need the scientific evidence that what you do to control that hazard will achieve a particular outcome, Hasell explained. MAF acknowledge that there is *'currently insufficient information on salmonella and campylobacter on raw poultry to establish national food safety objectives for these pathogens'* (MAF Food Assurance Authority 2000). The microbiology of campylobacter is very complex, Hasell told us, and there has not been a commitment from government to put the resources into gaining a better understanding. From her point of view, she considers it *'a mockery to require the poultry industry to implement HACCP if you cannot give them very clear guidance as to how they can achieve the outcome you want'*.

5.9 Negotiating responsibility for standards

Mark Cassidy, Technical Manager for Tegel Foods in Canterbury, explained that the Poultry Industry of New Zealand (PIANZ) is currently negotiating with MAF Food about what CCPs are needed to deal with pathogens in raw poultry. This is a critical issue evidenced by a 1999 Consumers Institute study in which 41 of 50 fresh chickens tested positive for campylobacter and salmonella. The Institute concluded that *'fresh raw chicken is likely to be contaminated with bacteria that can cause severe food poisoning'* (Consumer 1999:6). From the poultry industry's point of view, however, economics outweighs microbiology. As far as the poultry industry is concerned, responsibility for dealing with pathogens should be borne by the individual consumer not the industry. When asked about this report, Bob Diprose, head of PIANZ, explained that his organisation took no notice of it. The industry recognised only one CCP, and that is the home: *'cook chicken properly and you kill the salmonella and campylobacter, after all we don't live in a sterile world'*. Their concern is that if the company was to assume responsibility for the level of pathogens in chicken then it would be responsible for contaminated products. This could prove very costly and Cassidy explained

that delays in obtaining the results of microbiological tests made this impractical. By the time the results of the product were available to the company for evaluating, the product would most likely have already been sent out to customers, and perhaps even consumed. In any case, poultry companies don't believe that recalls are necessary *'because that product is still acceptable, so long as it is cooked and handled properly by the consumer'*. MAF disagrees, and this remains one of the *'big contentious issues'* of RMP.

While the poultry industry believes consumers are responsible for reducing pathogenic levels in the chicken they eat, and therefore avoiding food-poisoning, the industry does not welcome any efforts to inform consumers of this responsibility. When I asked Celia Murphy from the Consumers Institute why there was not more of an effort made to educate people about safe handling and preparation of chicken, Murphy replied that it is because the industry is afraid that people would then choose not to eat chicken. Murphy explained that when the Institute did its study on campylobacter and salmonella in chicken, the Poultry Industry Association was *'pretty cross with us for doing it'* and was *'not very helpful'*. She also said that when *'Auckland Healthcare have done some work advertising about food safety they have been really seriously challenged by PIANZ'*. Murphy believed that the Industry's fears were *'daft because if you tell people how to handle chicken properly then they don't have to get sick, and then no-one has to be afraid'*. One example that Murphy gave was the Food Safety Partnership, which is a consumer's education group that is mostly organised by the government but also includes some industry groups. She said that the chicken industry *'come along to all the meetings but they are there clearly as damage control, to know what's going on, and make sure that we're not going to say anything bad about chicken'*. Murphy said that while the red meat industry was prepared to put money into consumer education the poultry industry was not.

5.10 Conclusion

In this chapter I have argued that how RMP and the New Zealand standard are constructed, implemented, and monitored is not the result of a privileged scientific method but rather it is the product of networks made up of human and nonhuman actors. Individuals that we spoke with from within the meat industry, and those with ties to the meat sector, challenged MAF's views of risk assessment, risk management and the New Zealand standard as objective and scientific. Instead, they demonstrated that the content of these concepts and how they are constructed is the product of negotiations between different actors within the network. The

outcomes of these negotiations also reflect the fact that actors ‘bring to the table differential levels of power, authority and resources’ and therefore ‘they enjoy unequal capacities to negotiate, persuade, or coerce others to accept a particular standard-construction strategy’ (Juska *et al* 2000:266). The content of these negotiations regarding RMP and standards, therefore, is a product of the political, social, and economic interests of the different actors within the network.

This inequality in terms of negotiating power is illustrated most clearly in regards to the relationship between MAF and the meat companies in New Zealand on one side and the industry’s trading partners and international customers on the other. MAF believed that the introduction of RMP and the New Zealand standard would allow these relationships to be put on the same footing. MAF argued that a New Zealand standard based on RMP would have to be accepted internationally as ‘equivalent’ because it was based on scientific criteria. However, as this chapter illustrated, concepts such as equivalence, risk management, standards, and veterinarian science continue to be contested. Since New Zealand remains a small, export-dependent player on the world market then it remains in a weak position economically and politically to negotiate in its favour regarding these concepts. The result is that the meat sectors’ trade partners and customers continue to have the upper-hand in negotiations over what standards New Zealand is required to meet.

The position that the US takes in relation to New Zealand illustrates the important role that nonhuman actors can play in the negotiation process. In this case, a nonhuman actor—the pathogenic bacteria *e-coli*—has had an influential role in determining what food safety standards and what food safety regimes get implemented. Outbreaks of *e-coli* in the US, for example, and the consequential rise in consumer concern over meat safety, motivated the government and the meat industry there to implement certain microbiological testing regimes and HACCP was instituted as a means to try and prevent contamination of meat with *e-coli*. The US demands those countries, such as New Zealand, who export to the US implement these same standards of testing. Again, this example illustrates issues of power rather than science. New Zealand has demonstrated through its national microbiological database that covers all the export meat plants that New Zealand has a very low incidence of *e-coli* in relation to the US. It argues that it makes no sense, from a scientific point of view, to meet requirements such as testing on all products or the pasteurisation of whole carcasses. What scientific processes get put in place, however, whether it be swab testing for bacteria, sample

testing for *e-coli*, or the use of food technologists versus veterinarians, is the outcome of negotiations between these actors. All of these negotiations over science are influenced by the economic, social, and political realities that affect individual actors and their networks. These factors include consumer concern in the US and EU over safe meat, the US and EU concerns to protect their own meat producing industries, and New Zealand's desire to keep these markets open and profitable for them.

MAF argued that with the introduction of a New Zealand standard based on RMP that standards within New Zealand could be harmonised, thus improving food safety within New Zealand and facilitating the ability of domestic producers to move into the export market. However, unlike the export meat sector, which is unified under MAF and the APA, the domestic network is divided with different groups of actors involved. Firstly, the domestic sector is divided between two different sets of legislation, the APA and the Food Act; secondly, two different Ministries, the MoH and MAF, are responsible for separate sections of it and; thirdly, while primary processors must have an RMP, secondary processors have a choice between three separate food safety regimes: RMP, a Food Safety Plan, or the Food Hygiene Regulations 1974. These actors then reflect what processes in terms of food safety are carried out, what standards should be met and how these processes and standards should be policed. As we saw in this chapter there is a great deal of variation and inconsistency across the sector in these regards. Without bringing some unity to the domestic sector it seems unlikely that standards between the export and domestic sectors can be harmonised.

If it seems unlikely that standards can be harmonised within the domestic sector then it appears even more unlikely that they can be harmonised between the export and domestic sectors, even if we just focus on those processors who are operating under the APA and are required to implement RMP. The problem is that what RMP and what standards are implemented and what their content is reflects what resources are available to the various actors. The export sector can utilise the resources, skills, and knowledge of, for example, technicians, food technologists, microbiologists, and research laboratories that the domestic abattoirs simply cannot afford. It is difficult to measure, therefore, food safety outcomes and standards between two such disparate sectors.

What resources and actors become part of the network also reflects the interests of other actors within the network. In other words, most of the resources available in the export sector exist because they are a requirement for exporting their product to their most important

markets. On the other hand, few resources have been available for domestic food producers because the government has funnelled any available funding towards assisting the export sector. While the government and MAF recognise the importance of maintaining a good domestic food safety record the fact remains that it makes priorities in terms of funding and they see the export sector as playing a crucial role in contributing to the national economy. While there exists quantitative data that demonstrates the high levels of foodborne illnesses in this country, they are simply not considered serious enough to disrupt the pervasive 'kiwi' attitude of 'she'll be right'. This attitude has changed little since a 1993 article in the magazine *North and South* that highlighted food safety concerns in the meat industry, inadequate policing of premises, and the failure to adequately prosecute those companies found to be in breach of the law regarding hygiene standards. The author, Cate Brett (1993:82), argued then that her research demonstrated that 'preserving jobs and saving businesses has always taken precedence over punishing those who have been unfortunate enough to be caught out by inspectors'. I believe that this remains the case today.

Chapter Six

Conclusion

6.1 Introduction

This thesis has been concerned with examining RMP and the New Zealand standard in the meat industry as the product of actor-networks. My argument was that risk is not the result of objective, value-free, scientific practices as MAF assert but rather that the content and the implementation of risk management and the New Zealand standard is a process that is negotiated, constructed, and contested by the various human and nonhuman actors within the network that surrounds the meat industry. In this chapter I intend to conclude my thesis by examining the value of using the concept of actor-networks in relation to risk management in light of my research. As well, I will highlight those areas that I think are of value for further research.

As I explained in Chapter Two the concept of risk has largely been discussed from two opposing viewpoints. In the technical, scientific and social scientific literature risk has predominantly been described from a positivist perspective. MAF's position on risk, as reflected in their writings, can be situated within this framework. Here, risks are seen as objective – they already exist in nature – and therefore, with the appropriate scientific measurements and calculations, risks can be quantified and controlled. The goal of risk assessment, therefore, is to develop accurate scientific information so that the most rational decisions can be made. In this sense, risk management is not about identifying a single regime for eliminating risk but in fact weighing up the different costs versus benefits. While adherents of this position recognise that subjective influences are unavoidable in assessing risk since they are seen as introducing bias into the scientific process the goal is to minimise or eliminate them as much as possible.

The dominant alternative to this perspective within the social scientific literature is that risk, as with all science and facts, is socially constructed. This viewpoint emphasises the social and cultural contexts that shape what we consider to be risks. Risk cannot be objective or value

neutral because individuals and groups within society construct risk. Risk assessment and risk management, therefore, inevitably reflects both the interests of these people and what resources are available to them that allow them to identify and manage risks. In focusing on who is constructing risk and why some risks are legitimated while others are not, social constructionists inevitably focus their attention on the role and context of economic and political interests and power.

From my initial examination of texts in relation to the introduction of risk management I sensed that there were limitations to viewing risk as purely objective or socially constructed. I was persuaded that the conceptual framework of actor-networks, which has been increasingly used to analyse issues of science and technology but has rarely been used to analyse risk (the only reference that I found was Hilgartner 1999), offered some useful concepts that I was interested in exploring. This framework rejects the idea that science is either the sole domain of nature, whereby a reality ‘out there’ determines what is a fact, or the sole domain of society, whereby humans and social relations ‘construct’ facts. Instead, I have argued in this thesis that by following the process by which risk management was created, and the attempts to implement it, it is possible to see how both human (society) and nonhuman (nature/technology) play an essential role.

I have focused on using particular aspects of actor-network theory that I think are the most useful in terms of understanding how RMP unfolded. These concepts are that science and technology, and in this case risk management, are constructed through the process of building networks and that these networks are made up of both human and nonhuman actors. These actors are won to the network through the process of translation whereby each actor must be convinced that their interests will best be served by supporting and participating in the process. Finally, the construction of science is always a contested process and therefore the content of RMP and how it gets implemented is a product of these processes of building and contesting the network surrounding it.

6.2 Risk as the product of actor-networks

The process of constructing RMP and introducing it into the New Zealand meat industry was the product of building networks of actors. To unravel this process of network building I argued that the most useful strategy is to ‘follow an actor’ and in this thesis I followed MAF and its efforts to construct a network around RMP. The decision to follow MAF as the key

actor flowed from my analysis of the main texts and interview transcripts related to risk management. This data demonstrated that MAF was at the forefront of attempts to build support for the concept of risk assessment in the meat industry. My research began by examining government, industry and MAF documents and texts and following how MAF went about building support for the concept of risk management. This thesis has demonstrated that it took MAF more than ten years—from the time that MAF Food Authority Director, Andrew McKenzie, first raised the concept of risk in the second half of the 1980s until it was passed into law in 1999—to introduce RMP into the meat industry.

MAF argues that risk assessment and risk management is a scientifically superior method for ensuring food safety in comparison to the previous system that relied on traditional methods of organoleptic techniques. However, the more than decade-long process of constructing and implementing RMP demonstrates that risk is not the product of some privileged scientific method but rather the result of MAF enrolling growing numbers of human and nonhuman actors into a network to support its claims. These actors included Codex, the Meat Industry Hygiene Council, the Meat Industry Association, government ministers, and sections of the meat industry. Of particular importance in this process were the nonhuman actors, such as the SPS Agreement, Manual 5, and finally the APA itself.

MAF recognised that they simply could not get a meat industry that was cynical about food safety efforts and reluctant to spend more money on food safety to accept a radical new overhaul of the current food safety regime and standards. On their own MAF did not have the authority or the resources to convince the meat industry to support risk management. Their success depended on their ability to enrol as many actors in and around the meat industry as possible into the network surrounding risk. It was only when they could mobilise and multiply all of these other actors, with all their resources, texts, skills, manuals, expertise, status, money, and links to other actors and networks that stood behind them, that MAF was able to turn risk management into a ‘science’, something that could now be considered legitimate. The more actors that MAF could win into its network surrounding risk then the more likely it was that it could successfully implement RMP since there would be fewer stakeholders outside the network to resist the concept.

By following an actor the researcher can avoid making assumptions about who the main actors are and what their interests are. Based on my initial reading for this thesis and my own assumptions about the world I became convinced that the exporting meat companies were the

main players who wanted to introduce RMP. Faced with an increasingly competitive world market-place for meat, declining profits, and the growth of 'green protectionism', a move towards RMP appeared to be most advantageous to the export meat industry. It was only by following MAF and its efforts to build the network that I was able to challenge this assumption. What I found instead was a meat industry that was far from homogenous over the issue of RMP. As I have explained, while some of the export meat companies, such as the Alliance Group, have supported and participated in introducing RMP others, such as AFFCO, ANZCO and PPCS have taken a more cautious, less optimistic approach to the benefits of risk management.

The concept of actor-networks, therefore, can be seen as an effective mapping tool for doing research. The process of following a particular actor and understanding how the network gets built allowed me to identify who the various actors were that MAF believed were necessary to draw into the network and what the links were between these actors. Without using this strategy I would not have considered the importance that MAF placed in winning international players, such as Codex and the SPS Agreement, as important preliminary actors in the network. The objective of this mapping process is to attempt to identify all of the actors involved in the process, what their particular interests and goals were and why it was necessary to win them to the network. This strategy helps one to avoid making generalisations about amorphous macro-actors, such as 'the state' or the 'meat industry' and helps one to avoid assuming these actors are homogenous. By following individual actors and the network-building process we can see the various roles, conflicts, contradictions and interests revolving around individual actors and the relationships between each other. In mapping the network we can begin to sense the complexity of actors and their relationships. Following this process also helped me understand how the form, content, and properties of entities are not fixed but that their identity emerges and changes in the course of interaction.

6.3 Translating interests

Actors are won to and maintained in a network through a process known as translation. Different stakeholders surrounding the meat industry could only be drawn into the network supporting RMP if they believed that their interests would be better served by participating in this process than by going off on their own. The value of following MAF was that it was possible for me to begin to unravel and expose some of the arguments, resources, and devices that MAF used to try to win these actors into the network of RMP and keep them there.

Focusing on MAF's arguments and their attempts to translate the interests of actors within the meat sector to support the concept of risk management enabled me to develop a deeper appreciation of what MAF's objective was in introducing RMP. By analysing how MAF sought to build the network through translating the interests of stakeholders allowed me to explore MAF's assertion that their interest was in replacing the current food safety regime, which was based on subjective techniques, with a regime based on objective science and therefore improve food safety standards. Following MAF's attempts to win support from the meat industry revealed that the translation process centred around economic rather than scientific arguments and concerns.

While MAF's support for scientific RMP included the claim that it would objectively improve food safety standards the heart of their arguments were that the introduction of RMP would meet the broader economic and political interests of the export meat industry and the New Zealand economy more effectively than the current system. It is unlikely that MAF could have introduced RMP at an earlier period—even if RMP was shown to be an objectively superior form of ensuring meat safety—since it was the meat industry's broader economic concerns that drew them to supporting RMP. As I outlined in Chapters Four and Five these concerns included:

1. The need for export meat companies to deal with disparate, expensive, and often conflicting standards from their trading partners and customers that they believed had little relevance to food safety but instead functioned as protectionist measures;
2. The desire for unrestricted access of their meat products to foreign markets, which the rise of 'green protectionist' trade barriers threatened;
3. An increase in the number of food safety outbreaks in developed nations that had the potential to destroy the New Zealand export market if such an outbreak occurred in this country.

MAF recognised that there was an urgent need to improve market access internationally in terms favourable to New Zealand if the New Zealand meat industry were to remain competitive internationally. MAF asserted that the implementation of a New Zealand standard based on risk management would allow the industry to address these concerns. MAF argued that a New Zealand standard would allow the meat industry to meet two important objectives. The first objective would be to harmonise standards between the domestic and

export meat sectors. This harmonisation would improve food safety domestically, thus reducing the risk of a food safety outbreak that could jeopardise the New Zealand meat trade, and facilitate New Zealand businesses moving into the export market. The second objective would be that New Zealand's trading partners would be obliged to accept the New Zealand standard since it was based on science. Acceptance of the New Zealand standard would eliminate the need for companies to meet the various processing standards currently required from their trade partners, thus reducing their operating costs and improving profitability. MAF was convinced that food safety regimes based on risk management would end what they saw as subjective standards set by their trade partners that had more to do with defending commercial and political interests than ensuring food safety.

Winning actors from within the meat industry involved MAF demonstrating that it was in the interest of the industry to support RMP because the implementation of this system would facilitate the industry's ability to reduce costs, and remain profitable and competitive in the global arena. RMP was presented as superior because it was about handing greater responsibility for meeting food safety standards away from government to the companies themselves. As the central actor it was MAF who was able to define the concept of risk so that other actors accepted it and in doing so established themselves as obligatory points of passage, whereby others had to align themselves with MAF and accept their claims if they wanted to solve their own problems.

6.4 The role of nonhumans actors

An important contribution that actor-network theory has made to examining the construction of RMP is recognising the importance of nonhuman entities as actors within the network. My position throughout this thesis is that nonhumans mediate human relations, that interactions between humans are often made possible because of the role played by nonhumans. Thus any attempt to understand social relations must include an analysis of both human and nonhuman actors. In other words, while I do not accept that nonhumans, such as *e-coli* pathogens or the *Animal Products Act*, have intentionality or purposiveness I have argued that they do play a critical role in influencing the choices, actions, and decisions made by humans. In recognising the role that they play it was important for me to identify those nonhumans that MAF sought to include within the network, why they were enrolled, and how they impacted on how RMP was constructed and implemented in the New Zealand meat industry.

The success of risk management depends a great deal on nonhumans. Originally, inspection procedures for meat safety relied entirely on the ability of humans to recognise through the utilisation of their senses whether an animal or a carcass posed a threat to human health. With the recognition that some if not the most dangerous causes of foodborne illnesses are bacterial – that is, invisible to the human senses – then there arose the demand for greater use of microbiological sciences to quantitatively test for the presence of pathogenic bacteria. With the introduction of HACCP-based RMP many argue that there is no longer a role for organoleptic meat inspections. Instead, advocates of RMP argue that food safety is largely a matter of processes to ensure that the risk of hazards, such as *e-coli*, is reduced at every stage in the production process. RMP relies on a whole chain of nonhuman actors since its focus is on the documentation and auditing of procedures. Under risk management food safety relies, not on meat inspectors and veterinarians, but rather HACCP plans, risk management templates, the recording of procedures, and the auditing of the documentation produced as a result of this process.

While this study was able to identify the role of some of the most important nonhuman actors, such as the SPS Agreement, Manual 5, the APA, and *e-coli* there is considerable room for further research. At the time of my study RMP was only beginning to be introduced within the meat industry. Therefore, companies were still in the process of coming to grips with what nonhuman actors were necessary and what role they would play in the new food safety regime. For example, when I interviewed the Alliance Group they were just beginning to design RMP templates for their meat plants. Once this process has developed further it would be useful to analyse what nonhuman entities are part of the process and how they mediate the process of food safety and how the role of nonhumans vary, for example, between the domestic and export companies.

6.5 Contesting the network

Actors can only be drawn into the network if they believe that their interests will best be served by functioning through the network rather than going off on their own. Individual actors must therefore make compromises if the network is to be successful but at the same time their individual interests drive them to attempt to shape a particular outcome that will best strengthen their own position. A network, therefore, always consists of constrained relationships since actors come into the network with different interests and different levels of power, authority and resources with which to pursue those interests.

By analysing science as the product of networks I was able to demonstrate that there is no universal scientific understanding based on some objective criteria of what risk assessment, risk management, or the New Zealand standard is. This thesis has demonstrated that the construction of RMP and the New Zealand standard and how they were implemented was a contested process. The content of RMP and the New Zealand standard is not the outcome of some quantitative scientific study but instead reflects the outcomes of negotiations between actors with different interests bound within the network. By comparing the export and domestic meat sectors I was able to see how the content of risk and standards took shape depending on what actors were part of the network and what resources, such as research funding and technical expertise, they had access to. While MAF had a particular vision of what RMP should look like in theory, in practice its final shape reflected the negotiations, compromises and contestation within the network and the various roles that different actors played.

Examining the relationships between the New Zealand meat companies and their trading partners highlighted the influence of actor-networks in shaping standards. MAF believed that the introduction of RMP and the New Zealand standard would allow this relationship to be put on an equal footing. MAF argued that a New Zealand standard based on RMP would be accepted internationally as ‘equivalent’ because it was based on scientific criteria. However, this thesis demonstrated that concepts such as equivalence, risk management, and standards were contested. The New Zealand meat companies, as small, export-dependent players on the world market were in a weak position economically and politically to negotiate in their favour regarding these concepts. The result is that the meat sectors’ trade partners continue to have the upper-hand in negotiations over what standards New Zealand is required to meet.

The fact that networks are always a contested process also helped me to appreciate the role of nonhumans as actors. While the emergence of new pathogens such as *e-coli* can disrupt the network, other nonhuman actors play an important role in stabilising the network. While RMP is a negotiated and contested process, once all the nonhuman documents, laws, risk management templates, audit plans and standards, for example, have become ‘immutable mobiles’ – written down and made accessible to all the actors within the network – then the content and implementation processes of RMP become more difficult to contest by human actors. Immutable mobiles make social relations more durable because they order social relations across time and space. Once all of the actors have access to these materials it is

more difficult for actors to go off on their own and create their own texts, especially since they are likely to face financial penalties for ignoring them. As well, when rules, guidelines, information, laws and so forth have become embodied in durable texts for all to see it is more difficult for actors to contest their meaning. Once the content of RMP and the New Zealand standard have been coded, displayed and made available to the entire network these concepts will become black boxes, whereby the concepts are accepted without question and the internal complexity of what consists of a RMP, for example, is no longer debated. From the evidence that I have collected it is clear that RMP is far from becoming black boxed. The concept is still hotly contested and the various actors are still negotiating what many of the initial immutable mobiles, such as risk management templates, will look like.

6.6 Further research

Finally, I conclude this chapter by highlighting several important topics that my thesis did not have the time or space to examine but that I think would be valuable to research in the future.

Undoubtedly, my thesis only examined parts of the network surrounding RMP and the New Zealand standard and I think to understand the process more thoroughly account needs to be taken of some of the important actors that I did not discuss. There are three groups of human actors – farmers, consumers, and meat workers – that play a crucial role in ensuring food safety but who are by-and-large excluded from the network. MAF has made it clear that food safety based on risk management is about shifting responsibility for managing risks in food away from government officials onto stakeholders right along the food chain from the ‘farm-gate to the plate’. Farmers and consumers are the two groups of actors who are situated at the two polar extremes along this ‘food chain’.

While I have identified some of the changes that farmers have been required to introduce both legally and by the meat companies, such as company accreditation programmes and Statutory Declaration Forms, my study did not examine these in any detail. I think there needs to be further research on exactly what role farmers are expected to now play in relation to ensuring meat safety based on risk management. Does this role vary between farmers who sell their products to the export and domestic sectors? What actors are responsible for enforcing changes on farmers – MAF, the meat companies, New Zealand’s international trade partners? How will the changes impact on different groups of farmers? Why are farmers excluded from the network?

Consumers are expected by the meat companies and the government to play their part in ensuring food safety. As I outlined above, some companies, such as Tegal Foods argue that it is not necessary for meat companies to implement measures in the production process to reduce and eliminate dangerous pathogens in meat when these pathogens can simply be eliminated by consumers storing and cooking their food in an appropriate manner. In most of MAF's literature on food safety consumers are consistently pointed to as an important stakeholder in ensuring food safety, however, I found that consumer groups were largely excluded from participating in the network and from any decision-making role in relation to food safety. In fact, consumers are often referred to disparagingly as 'unscientific' and easily manipulated by 'irrational fears' about food safety. MAF sees itself as having an important role in countering the 'unreasoned fears' of the public with good science. What would be interesting to follow up is the way in which consumers are expected to play a role in ensuring food safety and why they are excluded from any decision-making role. Why does the government dismiss consumer fears around food safety simply as 'unscientific'? How and why do consumer views on risk and science differ from those of the government or scientists?

Officials from the New Zealand Meatworkers' Union explained in their interview that workplace practices in the meat industry have changed significantly as changes to the food safety regime have taken place. They explained that HACCP and RMP has seen the shift away from meat inspectors and veterinarians taking responsibility for overseeing that food safety practices and inspections are carried out correctly. Increasing, they argue, responsibility for ensuring meat safety and inspection of meat products is falling onto individual workers. According to the Union, this reorganisation of responsibility has coincided with layoffs and speed-up on the job. They believe that the introduction of HACCP and RMP is a cost-cutting measure by companies who have been able to lay-off MAF Quality Control inspectors and have meat workers incorporate inspection and safety procedures into their own job. I think it would be valuable to investigate further the exact nature of how workplace practices change with the introduction of RMP. How does the role of actors such as meat workers change? How are the nonhuman actors of RMP and HACCP actually organised and how do they function? What other workplace practices have been affected and in what ways?

An important area that I have not examined is the broader social, political and economic context in which the introduction of risk management was introduced. The changes to the meat safety regime that I have described did not happen in isolation and it would be valuable to analyse how the introduction of RMP relates to the political and economic changes that were occurring in New Zealand from the mid-1980s. From the mid-1980s, the New Zealand government adopted a programme that sought to reduce the role of the state in many areas of society that they were involved in and in doing so increase the role of the private sector. During this time the concept of risk management was introduced more broadly than just in the meat industry. It would be useful to draw the links between the changes in the meat industry with the broader philosophical changes that were happening in New Zealand society. Why did the concept of risk fit with the philosophy of deregulation and privatisation?

6.7 Conclusion

The concept of actor-networks has provided a useful framework for analysing changes to the food safety regime within the New Zealand meat industry. I have demonstrated that RMP cannot be viewed as simply the outcome of objective scientific practices nor is it socially constructed. Rather MAF's attempts to introduce risk management over the previous decade depended on their ability to win key stakeholders within the meat industry by convincing them that RMP would best serve their interests. This alone, however, would not ensure success. Crucial to this process was the role of nonhuman actors in stabilising the network and mediating human relations. However, while a new food safety regime based on risk management is in the process of implementation, key concepts of risk, equivalence and standards continue to be contested by actors within the meat industry, and their meaning and how they should be implemented is far from settled.

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Appendix A: List of interviewees (by affiliation)

Affiliation	Name and Position*	Date of Interview
AFFCO Group, Auckland	David Hall (Group General Manager)	22 February 2001
Alliance Group Ltd, Christchurch	Dennis Butler (Environmental Resources Manager); Kelvin Ashby (Systems Project Co-ordinator)	22 May 2000 and February 2001
ANZCO Foods, Wellington	Graeme Harrison (Managing Director)	23 January 2001
Asure New Zealand Ltd, Christchurch	Hamish Dobbie (Business Development Manager)	21 July 2000
Asure NZ Ltd, Christchurch	Paul Hamilton (pseudonym) (Meat Inspector)	19 August 2000
Australia New Zealand Food Authority (ANZFA), Wellington	Dr Sally Hasell (Senior Food Advisor)	25 January 2001
Christchurch City Council, Christchurch	Willis Heney (Environmental Health Officer)	15 February 2001
Consumers Institute, Wellington	Celia Murphy (Senior Writer); David Russell (Director)	24 January 2001
Farmer	Helen Marshall (pseudonym)	28 February 2001
Federated Farmers, Wellington	Maxine Yule (Industry Group Manager NZ Meat & Fibre Producers)	23 January 2001
Five Star Beef Ltd, Ashburton	Gus Crawford (General Manager); Jamie Gordon (Operations Manager)	8 February 2001
Institute of Environmental Science and Research (ESR), Christchurch	Dr Gerhard Nortje (Senior Consultant); Rosemary Whyte; Andrew Hudson; Rob Lake	7 February 2001
MAF Food Assurance Authority, Wellington	Carole Inkster (Director of Policy Co-ordination) Victor Walker	24 and 25 January 2001
Malvern Abattoir Ltd Christchurch	Michael Gilchrist (Manager)	26 February 2001
Meat Industry Association (MIA)	Angus Davidson (Executive Officer of Operations)	25 January 2001
Meat Industry Standards Council (MISC), Wellington	Dennis Butler (Chairman); John Miller (Secretary)	25 January 2001

Ministry of Health Christchurch	Mel Briesman (Chief Medical Officer)	8 March 2001
Ministry of Health, Wellington	Glen Neal (Food Safety Advisor)	24 January 2001
New Zealand Pork Industry Board, Wellington	Francis Clement (Quality Manager)	23 January 2001
NZ Meat Workers & Trades Union, Christchurch	R G Kirk (General Secretary); Graham Niles (Branch President); Alf Hill	29 May 2000
NZ Retail Meat & Allied Trades Federation, Wellington	Barry Whitaker	24 January 2001
Parliament of New Zealand, Minister of Consumers Affairs Wellington	Hon Phillida Bunkle (Alliance Party, Minister of Consumers Affairs);	25 January 2001
	Hon Sue Kedgley (Green Party)	23 January 2001
Poultry Industry of New Zealand, Auckland	Bob Diprose (Executive Director)	23 February 2001
PPCS, Christchurch	Grant Pearson (Processing Manager)	18 August 2000
Tegal Foods, Christchurch	Mark Cassidy (Technical Manager)	22 February 2001

* Position at the time of the Interview

Appendix B: List of interviewees (by name)

Name	Position*/Affiliation	Date of Interview
Ashby, Kelvin	Systems Project Co-ordinator, Alliance Group Ltd, Christchurch	22 May 2000 and February 2001
Briesman, Mel	Chief Medical Officer, Ministry of Health, Christchurch	8 March 2001
Bunkle, Hon Phillida	Member of Parliament, Alliance Party, Minister of Consumers Affairs, Wellington	25 January 2001
Butler, Dennis	Environmental Resources Manager, Alliance Group Ltd; Chairman, Meat Industry Standards Council (MISC), Christchurch	22 May 2000 and February 2001
Cassidy, Mark	Technical Manager, Tegal Foods, Christchurch	22 February 2001
Clement, Francis	Quality Manager, New Zealand Pork Industry Board	23 January 2001
Crawford, Gus	General Manager, Five Star Beef Ltd, Ashburton	8 February 2001
Davidson, Angus	Executive Officer of Operations, Meat Industry Association (MIA) and Meat Industry Standards Council (MISC)	25 January 2001
Diprose, Bob	Executive Director, Poultry Industry of New Zealand, Auckland	23 February 2001
Dobbie, Hamish	Business Development Manager, Asure New Zealand Ltd, Christchurch	21 July 2000
Gilchrist, Michael	Manager, Malvern Abattoir Ltd, Christchurch	26 February 2001
Gordon, Jamie	Operations Manager, Five Star Beef Ltd,	8 February 2001

	Ashburton	
Hall, David	Group General Manager, AFFCO Group, Auckland	22 February 2001
Hamilton, Paul (pseudonym)	Meat Inspector, Asure NZ Ltd	19 August 2000
Harrison, Graeme	Managing Director, ANZCO Foods, Wellington	23 January 2001
Hasell , Dr Sally	Senior Food Advisor, Australia New Zealand Food Authority (ANZFA), Wellington	25 January 2001
Heney, Willis	Environmental Health Officer, Christchurch City Council, Christchurch	15 February 2001
Hill, Alf	NZ Meat Workers & Trades Union	29 May 2000
Hudson, Andrew	Institute of Environmental Science and Research (ESR), Christchurch	7 February 2001
Inkster, Carole	Director of Policy Co- ordination, MAF Food Assurance Authority, Wellington	24 and 25 January 2001
Kedgley, Hon Sue	Member of Parliament , Green Party; Safe Food Campaign, Wellington	23 January 2001
Kirk, R G General Secretary	NZ Meat Workers & Trades Union	29 May 2000
Lake, Rob	Institute of Environmental Science and Research (ESR), Christchurch	7 February 2001
Marshall, Helen (pseudonym)	Farmer	28 February 2001
Miller, John	Secretary, Meat Industry Standards Council (MISC)	25 January 2001
Murphy, Celia	Senior Writer, Consumers Institute, Wellington	24 January 2001
Neal, Glen	Food Safety Advisor, Ministry of Health, Wellington	24 January 2001
Niles, Graham	Branch President, NZ Meat Workers & Trades	29 May 2000

	Union	
Nortje, Dr Gerhard	Senior Consultant, ESR Christchurch	7 February 2001
Pearson , Grant	Processing Manager , PPCS Christchurch	18 August 2000
Russell, David	Director , Consumers Institute Wellington	24 January 2001
Walker, Victor	MAF Food Assurance Authority Wellington	24 and 25 January 2001
Whitaker, Barry	NZ Retail Meat & Allied Trades Federation Wellington	24 January 2001
Whyte, Rosemary	Institute of Environmental Science and Research (ESR), Christchurch	7 February 2001
Yule, Maxine	Industry Group Manager, NZ Meat & Fibre Producers, Federated Farmers, Wellington	23 January 2001

* Position at the time of the Interview

Appendix C: Glossary of terms

Animal Products Act (1999) This Act replaces the *Meat Act* 1981. Its objective is ‘to reform and restate the law relating to the processing of animal material into products for use, trade, and export’ (*Animal Products Act 1999*: 4). Part 2 of the Act, which makes RMP mandatory in the meat industry comes into force on 1 November 2002.

ANZFA (Australia New Zealand Food Authority) ANZFA is a statutory authority operating under the *Australia New Zealand Food Authority Act 1991*. ANZFA works with a Council of Health Ministers called the Australia New Zealand Food Standards Council, to develop and maintain laws and systems, which regulate food in Australia and New Zealand. ANZFA develops food standards and other regulatory measures for the two countries. It is responsible for developing, varying and reviewing standards for food available in Australia and New Zealand and for a range of other functions including coordinating national food surveillance and recall systems, conducting research, assessing policies about imported food and developing codes of practice with industry (<http://www.anzfa.gov.au/WhatisANZFA>).

Asure NZ Ltd Is a state-owned enterprise (SOE) that took over control of the meat inspection service from MAF in November 1998. As an SOE, Asure has a commercial focus and their role is to deliver a profit (Dobbie 2001).

BSE (Bovine Spongiform Encephalopathy) is one of a group of separate yet related neurodegenerative diseases that affects animals and humans. The first cases of BSE were detected in Britain in cattle in 1985 and are believed to have been caused by contaminated feed prepared from animal carcasses. The human disease CJD (Creutzfeldt-Jakob disease), which has symptoms that are very similar to BSE, is thought to be transmitted to humans through the consumption of beef contaminated with BSE (Macnaghten and Urry: 1998).

Codex Alimentarius Commission Known simply as ‘Codex’. This international body is a joint subsidiary of the Food and Agriculture Organisation (FAO) and World Health Organisation (WHO). Its stated aim is to protect consumers’ health while facilitating fair trade practices. ‘Codex standards set safety minimums, but are designed so that they protect health while not unnecessarily restricting trade’ (*Food Focus* 2000)

E. Coli 0157:H7 Most strains of E. Coli are benign, however, this is not the case with E. Coli 0157:H7, which emerged in the US in the 1980s. The following description is taken from Juska *et al* 2000.

This strain [E. Coli 0157:H7] produces a toxin that causes hemolytic uremic syndrome (HUS), a disease that can cause permanent kidney damage among the very young and the very old. E. Coli 0157:H7 also regularly kills individuals in these age groups. It is difficult to detect and control E. Coli 0157:H7 because it does not cause any disease in its natural home, the intestines of cattle and sheep. During the process of evisceration and dehiding, E. Coli 0157:H7 from animals' intestines and/or manure on hides gets into the meat.

Equivalence In relation to food safety standards the concept of equivalence refers to the focus on outcomes rather than processes. Therefore, different companies or countries may carry out different regimes to meet particular safety and hygiene standards so long as the outcome – the standard met in the end – is equivalent.

Federated Farmers Represents approximately 15,000 farming and rural family members throughout New Zealand. The federation also maintains five industry groups, representing the specific interests of rural butchers, meat and wool, dairy, high country and grain farmers. The federation is governed by a National Council that meets twice a year, and a National Board that meets bi-monthly. A Wellington office provides a centre for policy development, advocacy, lobbying and legal services. Federated Farmers publishes *Federation Update*, a quarterly members magazine.

HACCP (Hazard Analysis Critical Control Point). MAF (2000b) describes HACCP as a scientific food production and inspection system that was first developed in the United States by NASA to ensure food safety for astronauts. Following the principles of risk analysis, HACCP focuses on preventative measures rather than end product testing and is applied throughout the food chain, from producer to consumer. Food is 'monitored throughout the production process so that all potential hazards (e.g., micro-organisms, chemical hazards and physical hazards) are either prevented or reduced to negligible levels' (MAF 2000b).

MAF Food Assurance Authority This group was created in 1999 when the MAF Regulatory Authority (MAF RA) was divided into two agencies. This agency focuses on primary production, processing and export of food and food related products rather than New Zealand's biosecurity. MAF Food set the standards and regulations for the meat industry.

Andrew McKenzie (2000), the agency's director, explains that MAF Food's role is to provide 'consumers and foreign governments with credible assurances that appropriate standards are in place to reduce risks in food and that these are being complied with'.

MAF Verification Authority (MAF VA) This agency verifies that industry are abiding by the regulations that MAF Food has implemented. Verification agents determine whether the meat plant, including operations and product assessment, are complying with both the registered RMP and any additional requirements that overseas markets may demand from New Zealand that require an official assurance.

Meat Act 1981 The predecessor to the *Animal Product Act 1999*.

Meat New Zealand Meat New Zealand is the operating name of The New Zealand Meat Board under the Meat Board Act, 1997. The Act states that the object of the Board is to attain for farmers the largest possible net return on New Zealand livestock, meat products, and co-products.

Meat Industry Association (MIA) The Meat Industry Association of New Zealand (MIA) represents companies supplying 99 percent of all New Zealand sheepmeat exports and 100 percent of beef exports. The Association's mission is to:

Provide a forum for consideration of industry-wide commercial, human resource, marketing, and sanitary and phytosanitary issues; provide the means of formulating a collective view on issues of industry wide interest, and of conveying that position to government, departments of state, trade bodies, and other appropriate external agencies and organisations.

The Association's goal is 'to improve profitability in the industry by helping its members achieve marketing and operational excellence' (<http://www.mia.co.nz/intro.htm>).

The New Zealand Meat Industry Standards Council (MISC) The Council consists of representatives from the New Zealand Meat Industry Association, Federated Farmers, Meat New Zealand, MAF Food Assurance Authority, and MAF Verification Authority.

New Zealand Pork Industry Board Operates in the interests of pig farmers to help attain the best possible returns for New Zealand pigs and pork products. The Board is funded by producers through a levy paid on all pigs at the time of slaughter.

Poultry Industry of New Zealand (PIANZ) The Poultry Industry Association of New Zealand represents the interests of all the poultry processing and livestock breeding companies in this country. Membership is voluntary but over 98 percent of the country's production is represented by PIANZ. Tegel Foods Ltd, Inghams Enterprises (NZ) Pty Ltd, and PH van den Brink dominate the industry with over 90 percent of production, the remainder split between approximately 15 smaller producers.

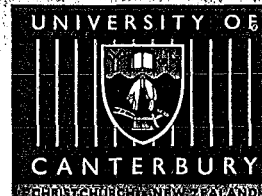
SPS Agreement The World Trade Organisation's (WTO) SPS Agreement ensures that countries apply measures to protect human and animal health (sanitary measures) and plant health (phytosanitary measures) based on scientific risk assessment.

Appendix D: University of Canterbury Human Ethics Committee Letter

University of Canterbury

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26 January 2001

Carmen M T Bain
C/o Dr Keiko Tanaka
Department of Sociology
UNIVERSITY OF CANTERBURY

Dear Carmen

The Human Ethics Committee advises that your research proposal **“Food safety standards in New Zealand: a comparison of the poultry and red meat industries”** has been considered and approved.

Yours sincerely

A handwritten signature in black ink, which appears to read 'Isobel S Phillips'. The signature is fluid and cursive, with the first letters of the first and last names being capitalized and prominent.

Isobel S Phillips
Secretary